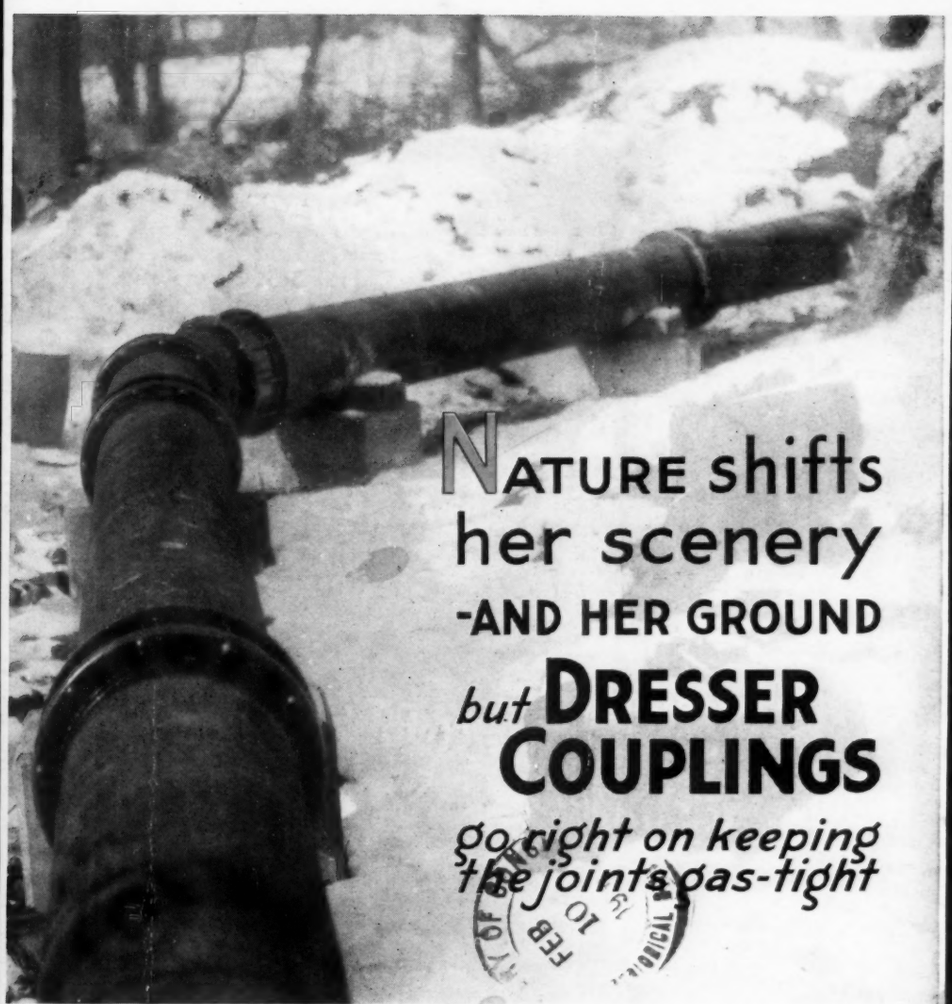
WESTERN GAS

February
1931

20 Cents
the Copy



DRESSER COUPLINGS
DOMINATE!

S. R. DRESSER MANUFACTURING CO., BRADFORD, PA.

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

PRINT IN BINDING

HYDRAULIC LIFTING OF PLUG ASSURES UNIFORM DISTRIBUTION OF LUBRICANT . . .

It is of utmost importance that a uniform distribution of lubricant be obtained in a lubricated valve. Otherwise, channels may remain unlubricated, causing leaks.

Positive uniform distribution of special "Merco" lubricant is achieved in the Nordstrom Valve every time the plug is lifted by hydraulic pressure in the operation of the patented Nordstrom method of "Sealdport" Lubrication. This lifting of the plug separates the seating surfaces so that a uniform distribution of lubricant can be obtained. This not only seals the valve tight against leaks but also protects the metal surfaces against wear.

Cup grease should never be used in Nordstrom Valves. For the most efficient service, always use "Merco" Lubricant, prepared especially for Nordstrom Valves. There is a "Merco" Lubricant for every valve service and our engineers will gladly recommend the lubricant best adapted to your requirements.

For tight pipe joints, always use "Merco" Pipe Compound. Easy to apply. Economical to use. Ask for latest Catalog.

ALL CHANNELS ARE LUBRICATED

VALVE IS SEALED TIGHT AGAINST LEAKS

METAL SURFACES ARE PROTECTED

MERCO NORDSTROM VALVE COMPANY
SUBSIDIARY OF THE MERRILL COMPANY . . ENGINEERS

Atlanta - Healy Bldg.
Boston - 184 Boylston St.
Buffalo - Genesee Bldg.
Charleston - W. Virginia
Chicago - 176 W. Adams St.
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Detroit - 2842 West Grand Blvd.
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Houston - Petroleum Bldg.
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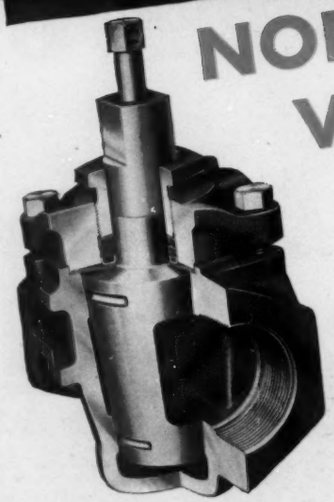
New York - 11 W. 42nd St.
Pittsburgh - Clark Bldg.
St. Louis - 317 N. Eleventh St.
San Francisco - 343 Sansome St.

Agencies:
Denver - Republic Supply Company, 332 Continental Oil Bldg.
Honolulu - W. A. Ramsay Co., Ltd., Fort & Queen Streets.
Philadelphia - Brown, Wilson & Company, 1600 Arch St.
Saginaw - Arthur C. Beckert, 112 Durand St.
Salt Lake City - National Equipment Co., 101 West 2nd South St.
Tulsa - B.V. Emery & Company, 216 E. Brady Street

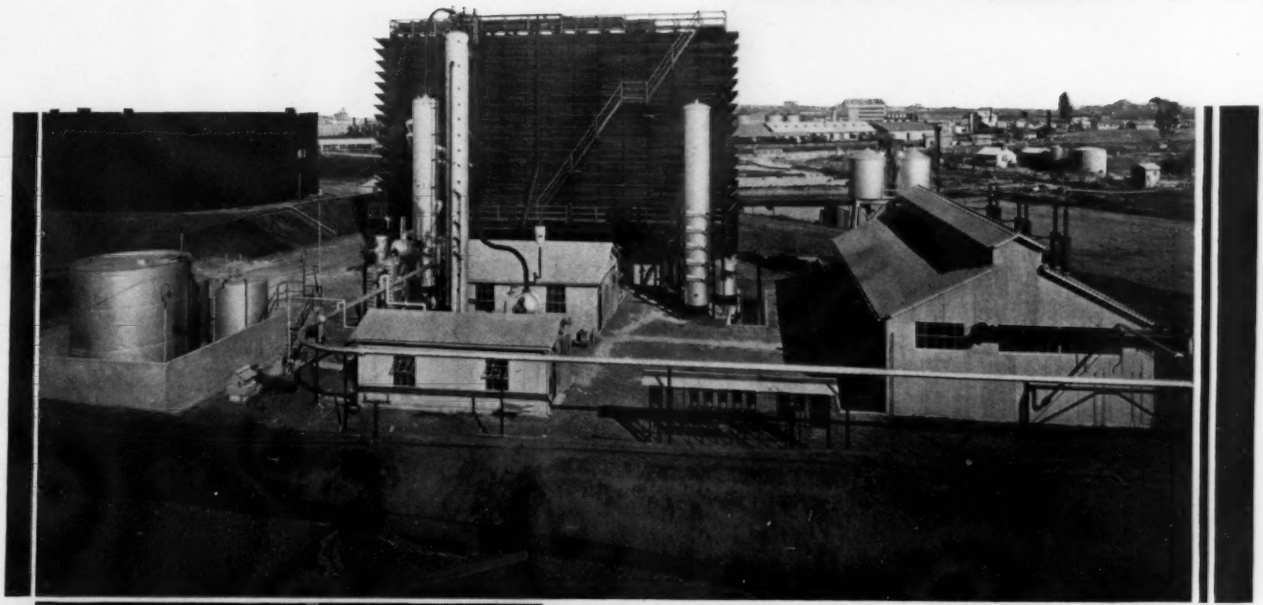
Factories in U. S. Oakland, Calif. and Belleville, N. J.
Canada - Peacock Bros., Ltd., Montreal, Toronto, Winnipeg, Vancouver. (Also Sydney, N.S.)
England - Audley Engineering Co., Ltd., Newport, Shropshire.
Buenos Aires, Argentine, - General Electric, Soc. Anon., Victoria 618 Esq. Peru.



NORDSTROM VALVES

THE PERFECT APPLICATION OF A PRINCIPLE

DO YOU KNOW WHO BUILT THIS PLANT?



Fluor!

IF you could walk through and observe the quality of workmanship and materials, the small friction losses due to unstinted pipe sizes, the provisions made for future economical expansion, you would recognize immediately—by these and all the other signs of fundamentally sound engineering—that here is another plant "Built by Fluor".

Years of experience have taught this organization the most economical and far-sighted methods of plant design. Many existing installations bear witness to this fact today. There is a Fluor representative near you.

COMPRESSOR STATIONS
ABSORPTION PLANTS
GENERAL
CONSTRUCTION WORK

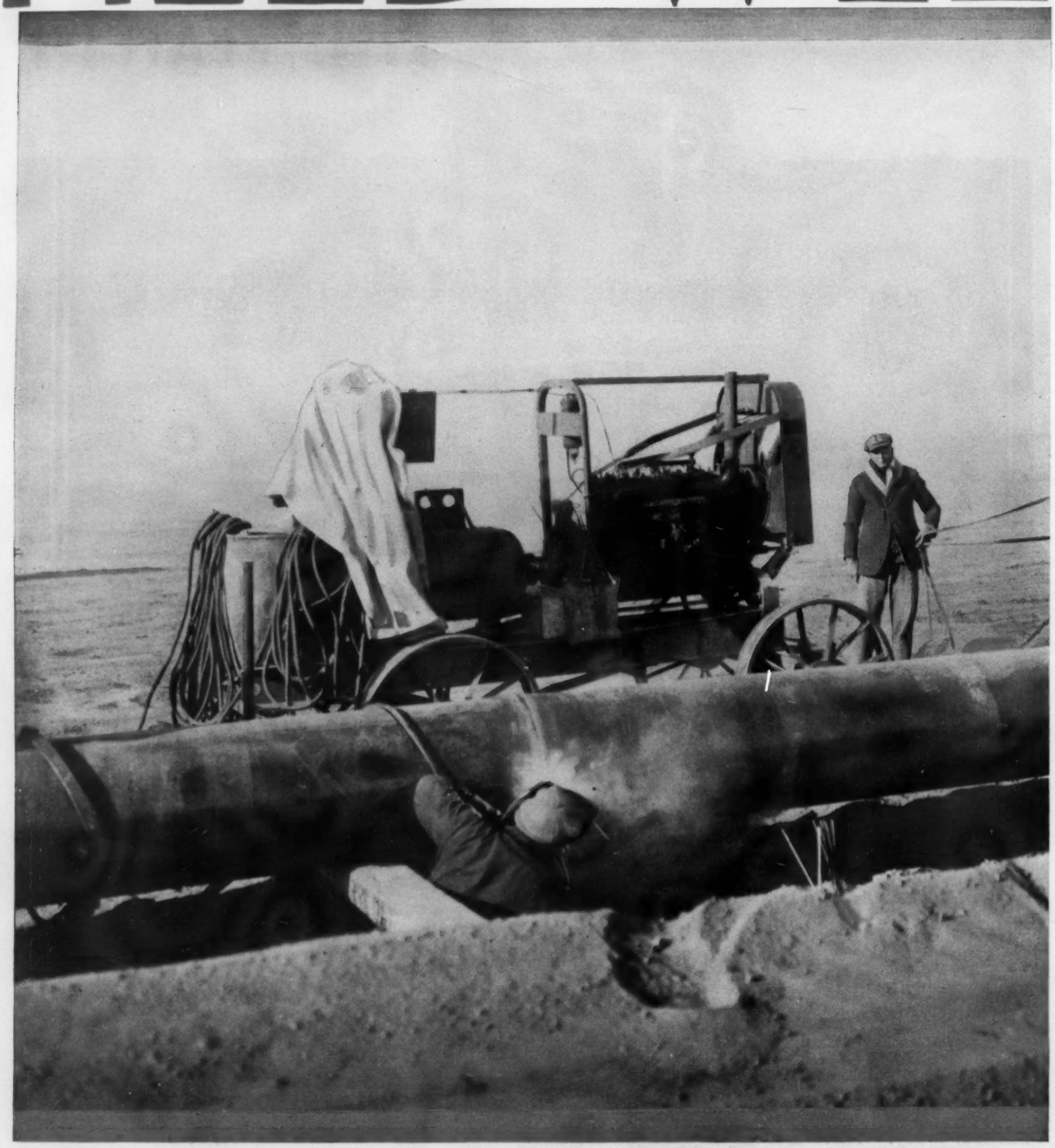
THE Fluor CORPORATION, LTD.

909 East 59th St., Los Angeles, Calif.

Tulsa, Okla. McBirney Bldg. | New York, N.Y. 30 Church St. | Dallas, Texas Magnolia Bldg. | Kansas City, Mo. 503 Fairfax Bldg.

February, 1931, Volume VII, Number 2. Western Gas is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

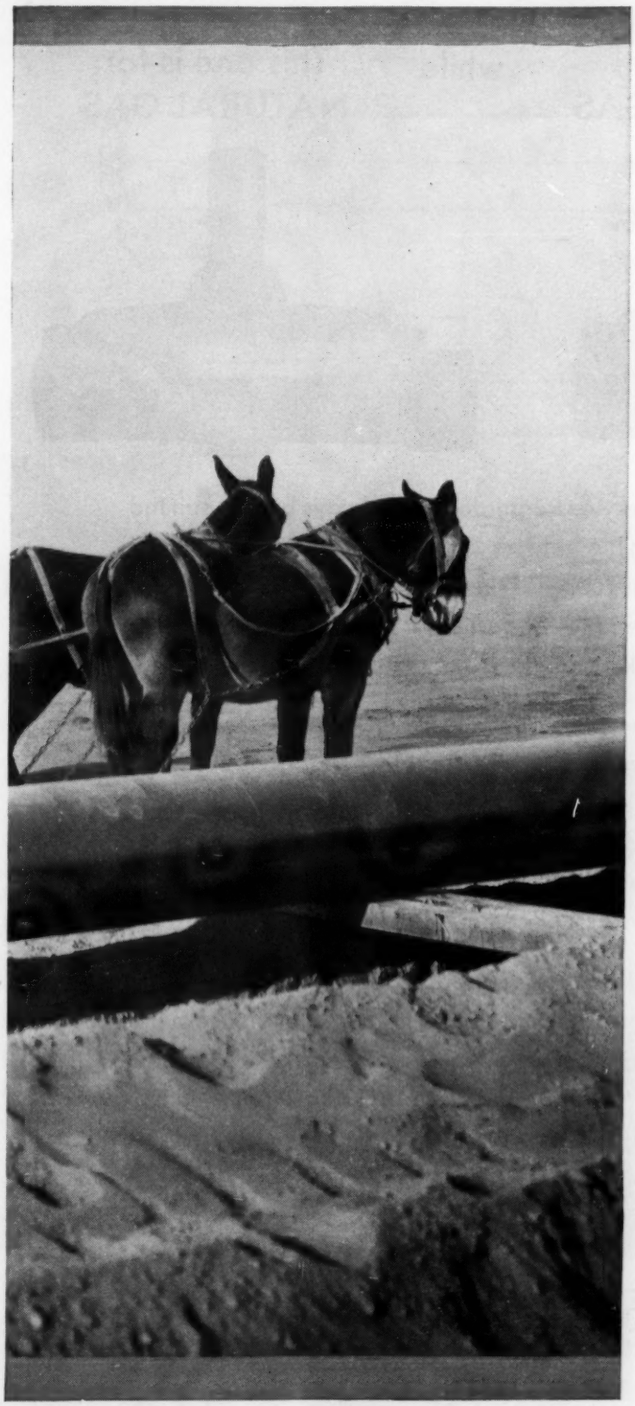
FIELD WEL



A bell hole welder tying in a 400-foot **SMITH***Welded 24" Pipe with* **SMITH***Welding*

SMITH*WELDED*

DING



Across California, ten welders welded 40-foot lengths of 24" pipe into 400-foot lengths and these 400-foot lengths into 4000-foot lengths, at a sustained average of 4700 feet per day.

A. O. SMITH CORPORATION

General Offices: Milwaukee, Wisconsin

OIL AND GAS FIELD PRODUCTS DIVISION

District Offices:

New York · Tulsa · Houston · Los Angeles

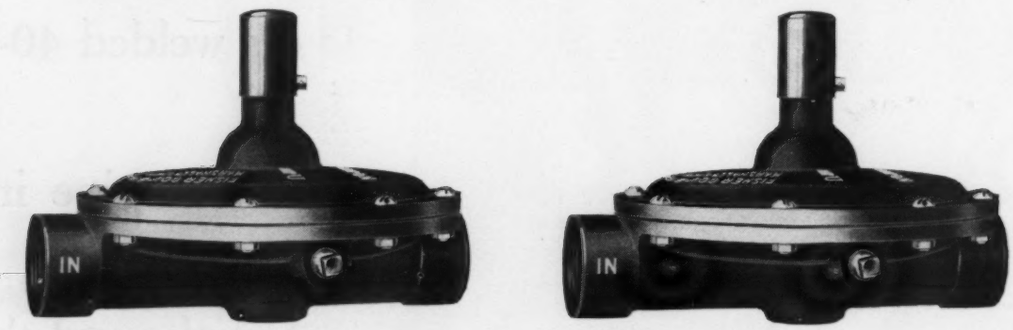
GAS LINE PIPE

These House Service Regulators LOOK ALIKE, BUT . . .

This one is for MANUFACTURED GAS

while

This one is for NATURAL GAS



THE point is that Fisher House Service Regulators are always built to suit the particular kind of gas on which they will be used . . . whether manufactured gas, natural gas, butane, propane, or other gas. Fisher has no "standard" or "stock" regulator that is recommended regardless of service . . . because the regulator that is correct for one kind of gas is not the best for another kind.

The exhaustive research work on house service regulators that was done in the Fisher Experimental Laboratory and the field investigations made by Fisher Engineers have resulted in the development of special valve and diaphragm materials to be used for each kind of gas. That these special materials assure maximum regulator efficiency and longest life has been demonstrated time and again in actual commercial service.

The high pressure range as well as the desired range of low or reduced pressure is an important consideration in the building of Fisher House Service Regulators. By means of various sizes of valve orifices and adjustment springs, Fisher assures the most sensitive regulation . . . no "stock" combination of spring and orifice will give this result over the regulator range.

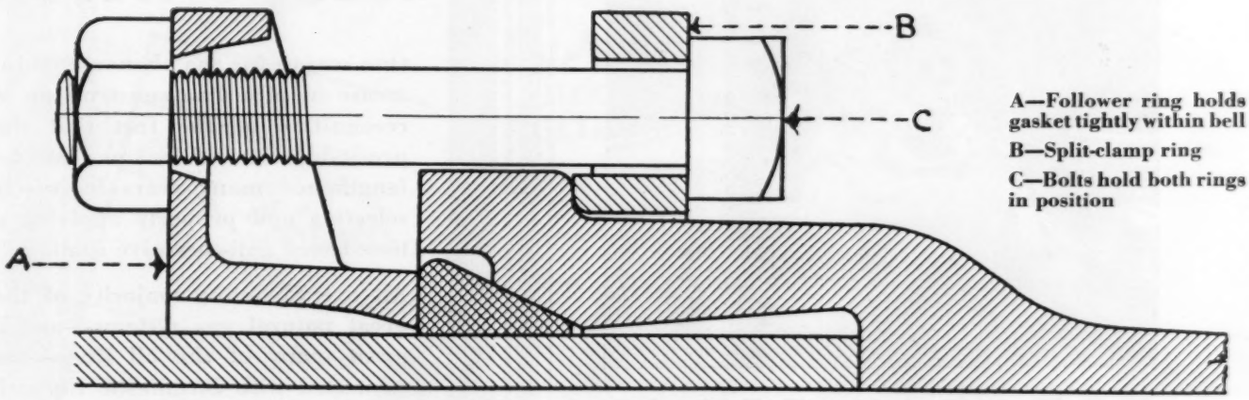
Write for Bulletin No. 805 which gives detailed information.

FISHER

THE MARK OF SCIENTIFIC FLUID CONTROL

THE FISHER GOVERNOR COMPANY
2400 Fisher Building
MARSHALLTOWN, IOWA

The New ANTHONY JOINT



A—Follower ring holds gasket tightly within bell
B—Split-clamp ring
C—Bolts hold both rings in position

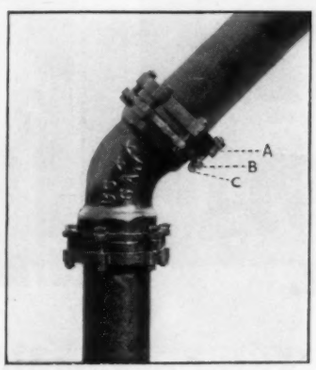
—*as simple as A. B. C.*

Speed of installation and tightness under pressure are the two main reasons for the wide acceptance of the New Anthony Joint. Here is a joint which eliminates entirely the delay and bother of calking. It does away with the preparing and pouring of joint compounds. You merely slip on a gasket, tighten six bolts and there's your joint. Tight as a drum—capable of withstanding maximum gas pressures for years on end.

This New Anthony Joint allows for a surprising amount of deflection. Cast iron pipe equipped with this joint can be laid in steep or winding trenches without the aid of special fittings.

The New Anthony Joint is offered in either deLavaud centrifugally cast pipe or in pit cast pipe and fittings. All rings, bolts and gaskets are interchangeable.

Of special interest is the fact that Anthony Joint bends, tees and other fittings can also be used with plain end pipe. These Anthony Joint fittings enable the contractor to make sure of the tightness of the important terminal points of his line. Ask us for complete information regarding the many advantages which this new joint offers.

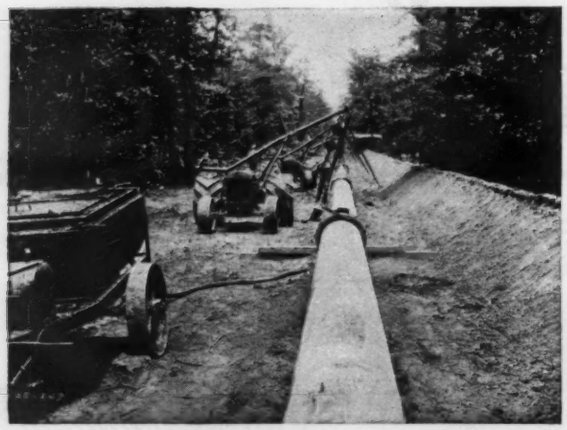


United States Pipe and Foundry Co., Burlington, N.J.

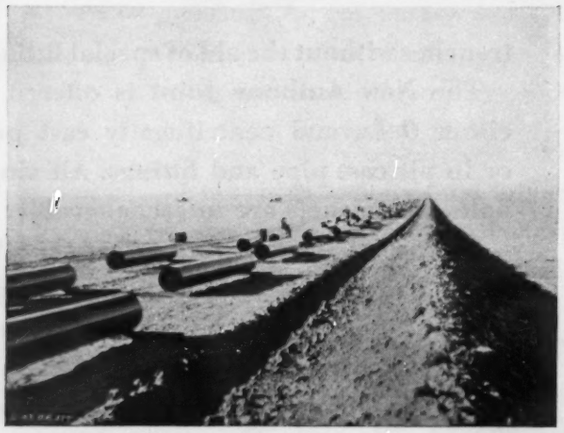
Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

Sales Offices:
New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

More and More



FOR GAS LINES
FOR OIL LINES

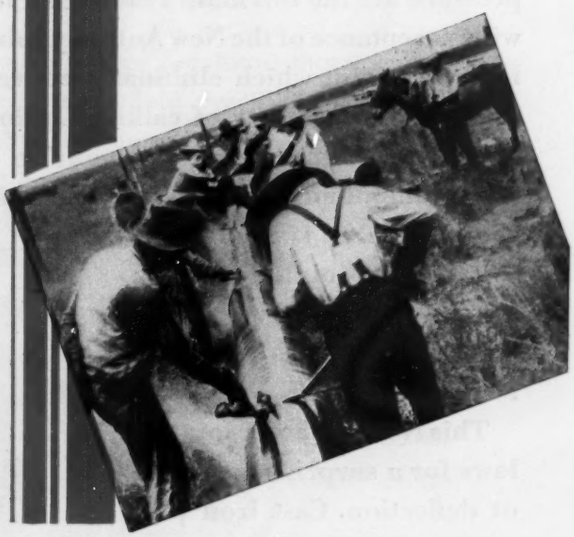


BITUMASTIC
REG. U.S. PAT. OFF.
ENAMEL

RECOGNITION

One reason for the phenomenal increase in pipe line construction is recognition of the fact that the profitable life of a line can be lengthened many years by wisely selecting and properly applying a time-tested anti-corrosive coating.

An overwhelming majority of the great natural gas systems—and a great many of the oil lines—are protected with *Bitumastic Enamel*. In 1930 nearly 10 times as much *Bitumastic Enamel* was used on pipe lines as in 1926. Recognition so noteworthy is achieved in only one way—*proof of superior performance*.



The proven Anti-Corrosive Coating that has been relied upon for nearly 50 years

WAILES DOVE-HERMISTON CORPORATION

NEW YORK—17 Battery Place HOUSTON—Petroleum Building CLEVELAND—Union Trust Building LOS ANGELES—2464 Enterprise St.
TULSA—Philtower Building CHICAGO—20 N. Wacker Drive PHILADELPHIA—401 N. Broad St. SAN FRANCISCO—345 Vermont St.

Engineers Demand

BITUMASTIC

REG. U.S. PAT. OFF.

ENAMEL

RECORD
RELIABILITY
Easily Applied
Economy

For complete information or service address our nearest District Office

WAILES DOVE-HERMISTON CORPORATION

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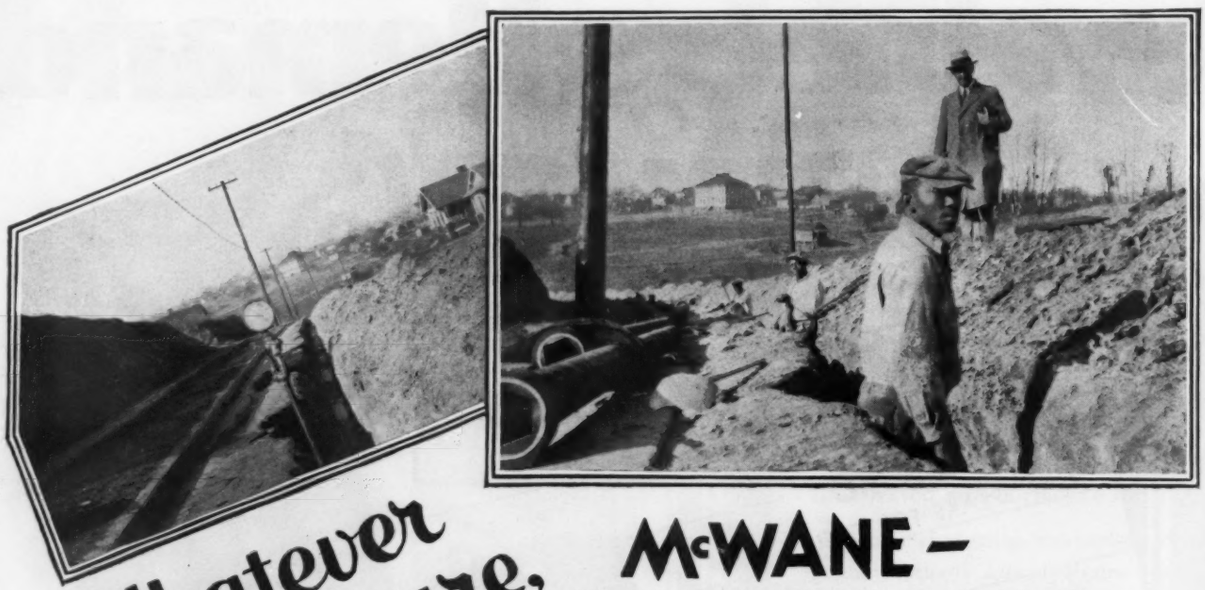


Whatever the pressure,— McWANE-PACIFIC PIPE

80 Pounds, air, was the test pressure requirement met by this 6-inch McWane cast iron gas main with Flexpan Joints. And they will hold far higher pressures whenever called upon—now or later. Every possible movement—in and out, or sidewise—is provided for by their unique design. Leakproof. And *Western-made.*

RUSTPROOF PIPE

McWANE-PACIFIC cast iron gas pipe needs no coating or coddling. It cannot rust. Smoothness and uniformity, straightness and strength, distinguish it. Modern—yet *sand cast.* Tensile strength averages 30,000 lbs.; transverse 2,600 lbs.

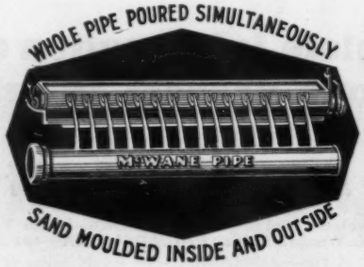
LEAKPROOF JOINTS

A wide range of joints adapts McWane-Pacific Pipe to all gas pressures and conditions in ordinary use. Furnished B.&S., plain-ends, or special for various types of trench-made joints. Also with Flexpan factory-made gas-tight joints as shown above; or with threaded joints without couplings.

SMALL SIZES FOR HIGH PRESSURES

1¼, 2, and 3-inch McWane-Pacific cast iron pipe in long laying-lengths is making tremendous strides in the high-pressure gas field. End *your* rust and leakage troubles with it, too. Booklet.

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA



PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

Los Angeles 417 S. Hill St. | San Francisco 111 Sutter St. | Denver 226 Contl. Oil Bldg. | Portland 611 Spalding Bldg. | Chicago 208 S. LaSalle St. | Dallas 1807 S. F. Bldg.

Cast Iron Gas Mains laid in 1840 still serve the City of Memphis

NINETY-ONE years ago, the City of Memphis, Tennessee, laid its first cast iron gas mains. Today, a number of those self-same mains are still giving satisfactory service. Of course. many of the original cast iron pipes have been removed from time to time as the demand outgrew their capacity. Some were taken out due to re-routing and to street construction. But, in certain sections of Memphis, you will find many of the original cast iron gas mains still serving faithfully. Other cities can point to cast iron gas lines with even longer records of service. In Philadelphia, in Boston and in Baltimore, cast iron gas mains which were laid prior to the year 1837 are still in daily use.

Surely, when those old-time cast iron gas mains are making unequalled service records, it is not to be wondered that engineers are today specifying *modern* cast iron pipe for the gas mains of our cities.

The Cast Iron Pipe of today is even better than the pipe laid years ago. Today, laboratory control and time-tested methods assure a high uniform quality not thought of in the Cast Iron Pipe of three generations ago. Present day knowledge of metallurgy and improved methods of manufacturing pipe have resulted in an improved product. And, new designs in joints and fittings have kept Cast Iron Pipe in step with the advance of the gas industry.

Engineers, contractors and city officials desiring information on the use of cast iron pipe for gas, water, sewers, road culverts, or for industrial needs, are invited to write to Thomas F. Wolfe, Research Engineer, The Cast Iron Pipe Research Association, 309 Peoples Gas Building, Chicago, Ill.

Efficient mechanical joints for cast iron gas mains are now in use and obtainable for high-pressure gas distribution.

CAST IRON PIPE

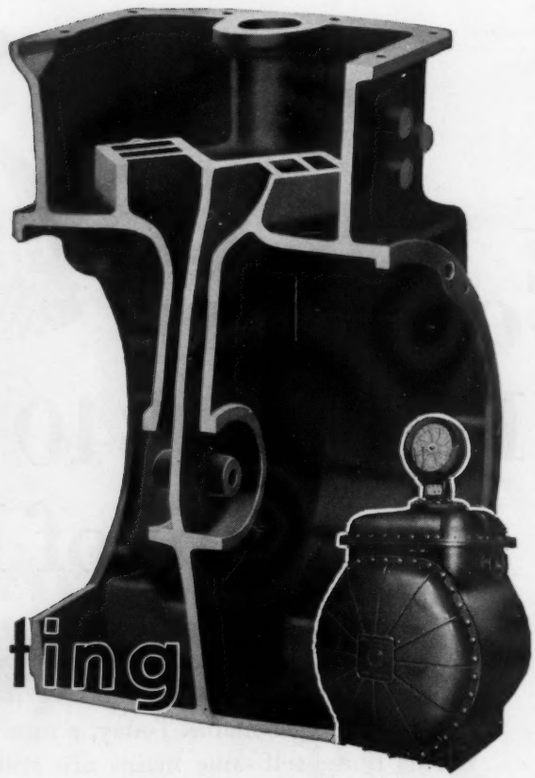
Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.;

Reg. Trade Mark

CAST Q IRON

The "Q-check" symbol shown above has been adopted as the trade mark of The Cast Iron Pipe Research Association.

Glamorgan Pipe and Foundry Company, Lynchburg Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York.



One-piece Ironcase Casting

Eliminates the possibility of Internal Case Leaks

OF GREAT IMPORTANCE to the accuracy of any displacement meter is the construction of the case. In Metric Ironcase Meters, the valve table, partition and channels are cast as an integral part of the body. There can be no internal leakage between measuring compartments.

Even a minor internal leak can make a meter incapable of measuring a pilot light load. For that reason, all meters are given a rigid low fire test before leaving our factory. And the test record of Metric Ironcase Meters with their leak-proof one-piece bodies, proves convincingly the value of this important structural improvement.

The one-piece principle of Metric construction is illustrated by the cross-sectional view of the 5-B body casting. This advantage is available in every Ironcase meter which includes 5-B, 10-B, 20-B, 25-B, 30-B, 35-B, 60-B, 80-B, 250-B, and 500-B.

Write for our Ironcase Catalog EG-40.

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

METRIC METAL WORKS
ERIE, PENNSYLVANIA
Ironcase, Tinned Steel Case and Orifice Meters

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
Established 1836

SALES · ERIE · DALLAS · TULSA · DENVER · LOS ANGELES · SAN FRANCISCO · KANSAS CITY
SERVICE · PITTSBURGH · CHICAGO · PHILADELPHIA · NEW YORK · BALTIMORE · BOSTON · ALBANY

WALCO

Pipe Wrench

MADE BY WALWORTH (PATENTED)

- Forged 1-piece bar and frame *new*
- Fewer parts *new*
- Easier action *new*
- Greater Strength

Made especially to withstand hard use in gas service.

WALWORTH

. . . Distributors in Principal Cities of the World . . .

General Sales Offices: 60 E. 42nd St., New York

WALWORTH CALIFORNIA CO., 235 Second St., San Francisco

WALWORTH COMPANY, 809 Fourth Place, Los Angeles

When renting or buying a home...
remember Natural Gas heating is the most modern and costs less!
IF a heating plant is modern, it gives the same kind of convenient warmth and comfort you find in fine hotels and apartment houses. If it is not, you'll find work and trouble in having heat, and at best the results will be unsatisfactory.
That is why you should inspect the heating equipment when selecting your next home. See that there is Natural Gas heating and you'll be sure the home will be properly heated.
With Natural Gas, a finger's touch starts healthful heat flowing into your home. Natural Gas itself is the cleanest fuel — that means your future home will stay fresh and new longer. Natural Gas lends itself easily to safe automatic control — no overheating to cause plaster to crack or chilly under-heating to cause colds. Natural Gas is the cheapest fuel to use—thousands of our customers tell us that.
Point by point, Natural Gas heating has the advantage. So it will pay you to be "choosy" when selecting your next home. Make sure it's heated with Natural Gas
For Natural Gas heating equipment see a DEALER or the
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned·Operated·Managed by Californians·

Actual size of this newspaper advertisement, 3 columns by 10 inches.

INCREASED POPULATION —and ADVERTISING—

Factors which Boost Dealer Sales

Population of the Pacific Coast States has increased 2,627,562, or 34.23%, in the last ten years. This means a vastly bigger market for the sale of gas heating appliances—greater opportunity for dealers.

Important to dealers also is the extensive advertising campaign planned for 1931 by Pacific Gas and Electric Company. Definite sales messages will reach the homes of 1,231,381 consumers every week. These consumers are potential buyers.

Our advertising and sales efforts are planned to help you—and what you do helps us. Our advertising directs prospective buyers to the Dealers. Notice the above reproduction.

Dealers in P. G. and E. territory can benefit by tying in their own sales efforts with this cooperative advertising.

One of the most effective tie-in steps with which the dealer may interest prospects is a suitable window display of the appliances featured in our current newspaper advertisements.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned·Operated·Managed
by Californians·

WG 2-31

Handling Costs for Pipe Lines Are Higher Than They Need Be

NOW, more than ever, pipe line costs must be kept to the minimum. Yet, heavy pipe (so hard to handle) is increasing the total cost of many lines by costing more to lay.

Economy lies in the use of a light (easy to handle) pipe.

Naylor Pipe is the lightest of all oil and gas line pipe. It weighs one-half as much as standard weight wrought pipe, yet it will carry the same pressures because of the added strength provided by its *spiralwelded* lock-seam.

Because Naylor Pipe is so much lighter in weight it is easier to handle. Ease of handling speeds up the laying and requires fewer men in the field. Faster work and less labor reduce handling costs, thereby materially reducing the total cost of the completed line.

Companies contemplating the laying of new oil and gas lines should consider the economic importance of the light weight advantage of Naylor Pipe.

Gas gathering line of Naylor Pipe being laid for a prominent Mid-Continent oil company

NAYLOR PIPE COMPANY, Main Office & Plant, 1230 E. 92nd St., CHICAGO

PIPE CARRIED IN STOCK AT CHICAGO, HOUSTON AND LOS ANGELES

SALES OFFICES

New York 3116 Chrysler Bldg. ◆ Philadelphia Witherspoon Bldg. ◆ Tulsa 507 Philtower Bldg. ◆ Houston 2301 Commerce St. ◆ Ft. Worth 402 Petroleum Bldg.

MONTREAL, CANADA: Mechanical Equipment Company, 660 St. Catherine St., West

CHAMPION & BARBER, Inc.
576 Subway Terminal Building
Los Angeles California
Exclusive Distributors:
California, Nevada & Arizona

C. H. ELSTNER
Apartado 284
Monterrey N. L., Mexico
Representative in Mexico

TONCAN COPPER

Naylor Pipe

Maximum Structural Strength Mo-lyb-den-um With Minimum Weight

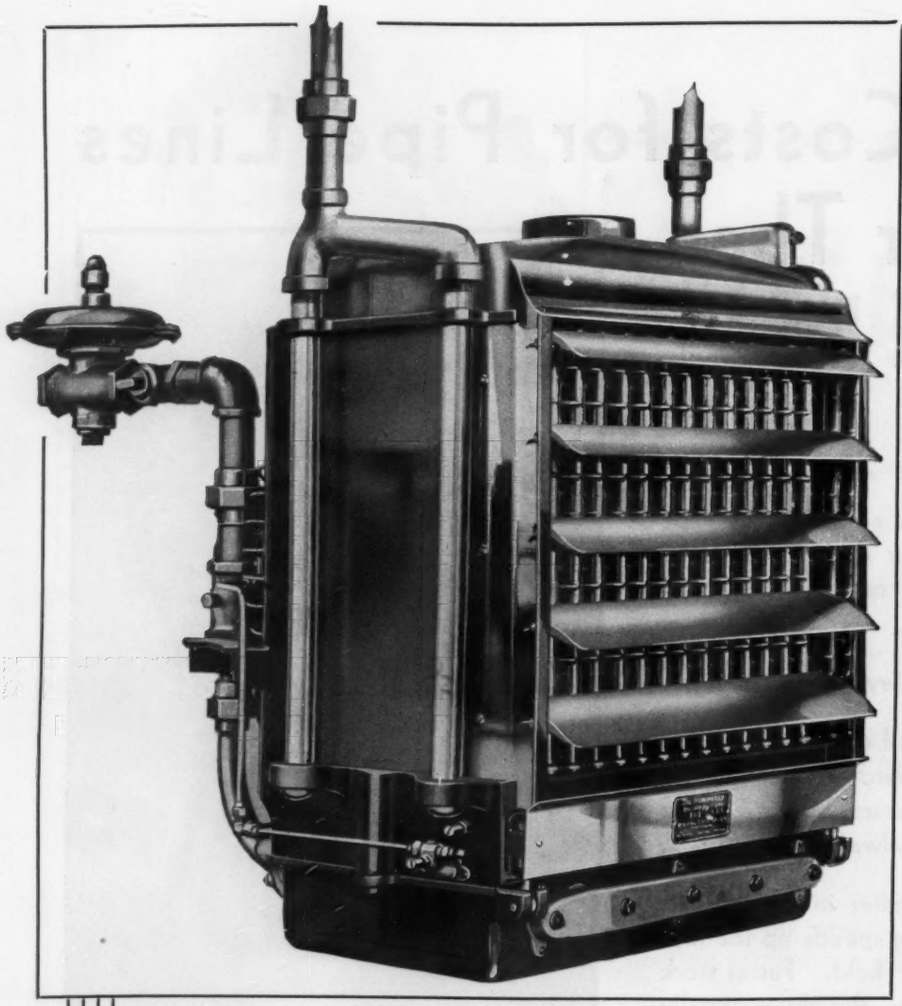
IRON

Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40'0". Ends made to wrought pipe standards for all types of coupling.

Gordon & Belyea, Ltd.
101 Powell Street
Vancouver, B. C.

Toncan Copper Molybdenum Iron possesses a superior corrosionresistance, making it the favored pipe material.

Where corrosion is not a problem, Naylor Pipe can be furnished in steel.



IT BURNS GAS

HOURLY INPUT—200,000 B. T. U.—when vented equivalent to about 750 sq. ft. steam radiation.

The new No. 200 Humphrey Gas Unit Heater burns gas in a new, clean, efficient and economical manner. It is self-contained and can be controlled either by remote or thermostatic control to meet any commercial or industrial heating condition.

Its high efficiency, economy and facility of installation make this unit a valuable contribution to the gas heating world.

A HUMPHREY Product

made by GENERAL GAS LIGHT COMPANY

Kalamazoo, Michigan

C. B. BABCOCK, Pac. Coast Mgr., 135 Bluxome St., San Francisco

Now! 15 Years of dependable Westcott Service

FEATURES

Uniform area of the mercury chambers. Large area of float. Floats and chambers especially treated so that the meniscus of the mercury is always of the same form. Clearance between float and side walls always sufficient to permit mercury to surround the float entirely and prevent inaccuracy. Long length of lever arm. Small angle of movement of the pen arm. Minimum number of moving parts.

Even the slight shift of the center of gravity of the pen arm and connections, as the pen moves throughout the range of the chart, is counter-balanced.

Every Westcott Differential Gage is tested for accuracy against a water column at 10 different ranges and its accuracy is equal to the smallest visible reading on the test gage or chart.

SINCE 1915, when it was first installed on a natural gas line, the Westcott Orifice Meter has won dominant recognition in the natural gas, manufactured gas, natural gasoline and petroleum industries. Today it is extensively used as the standard measuring instrument, not only for gases, but for steam and many liquids. It is backed by extensive Research in Field and Laboratory.

You will find Westcott Orifice Meters clustered around industrial centers, also in many remote locations, where implicit trust has to be placed in reliable operation.

And through fifteen years of dependable service the Westcott has proved itself worthy of a world-wide trust. Its correct and up-to-date design, the exact construction of orifices and differential elements, the uniform excellence of recording mechanisms—all together have endowed this meter with a degree of accuracy above and beyond the most exacting requirements of orifice metering today. Write also for information on Rate Volume Controllers, Indicating Flow Meters, Liquid Level Recorders and similar equipment.

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

GENERAL OFFICES : 105 W.40TH STREET · NEW YORK, N.Y.

SALES · ERIE · HOUSTON · DALLAS · TULSA · DENVER · LOS ANGELES · SAN FRANCISCO · ALBANY · BOSTON
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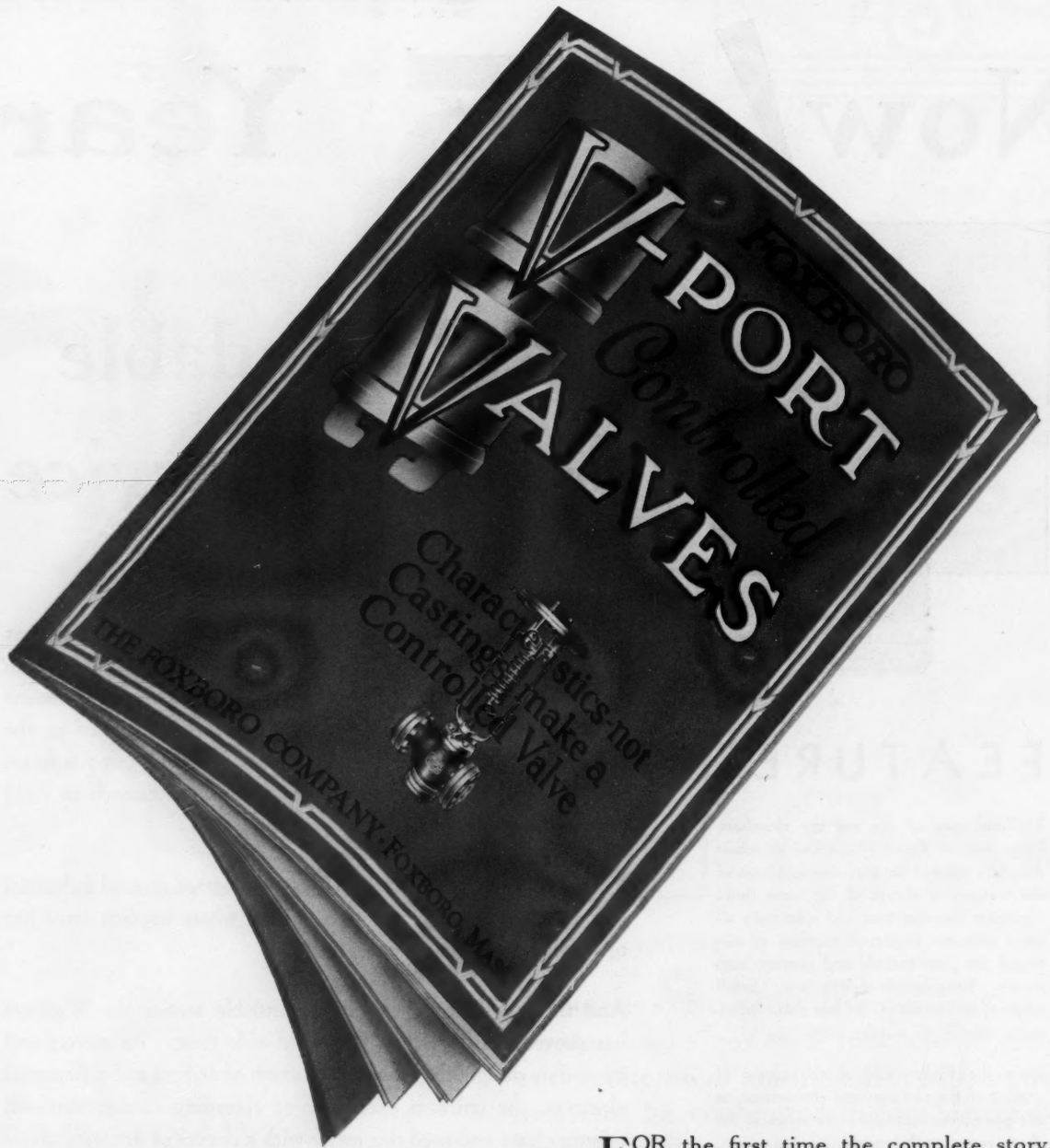

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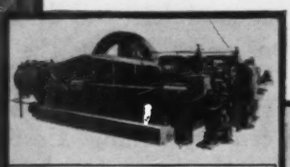
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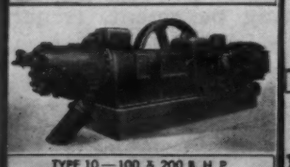
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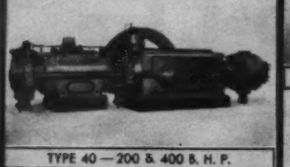
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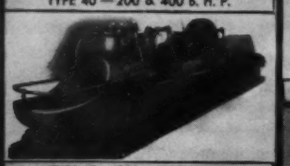
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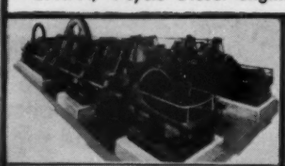
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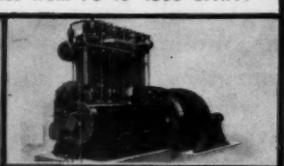
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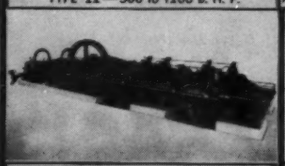
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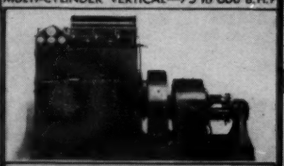
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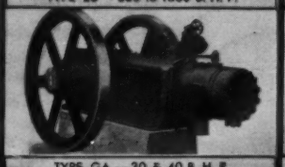
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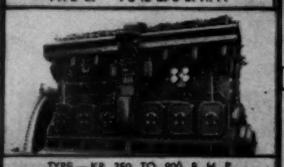
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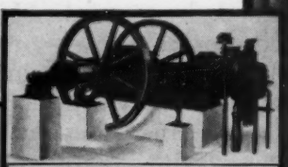
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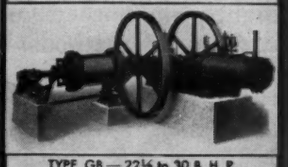
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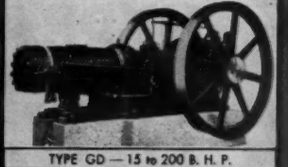
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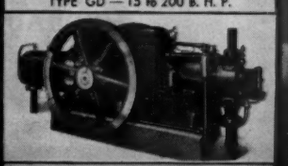
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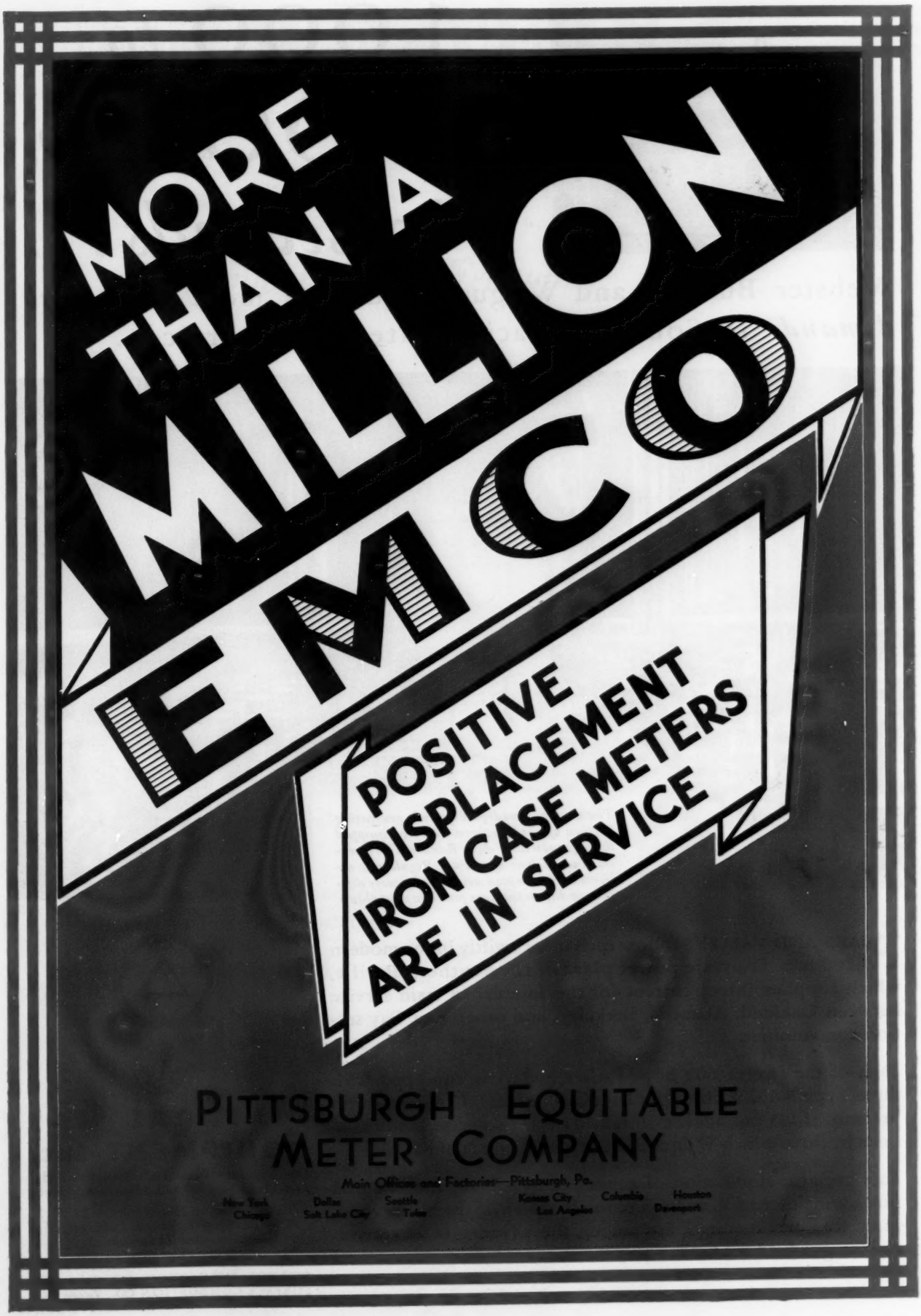
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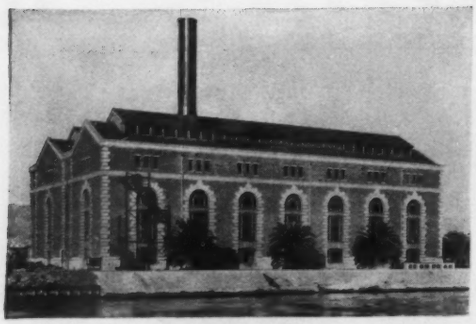

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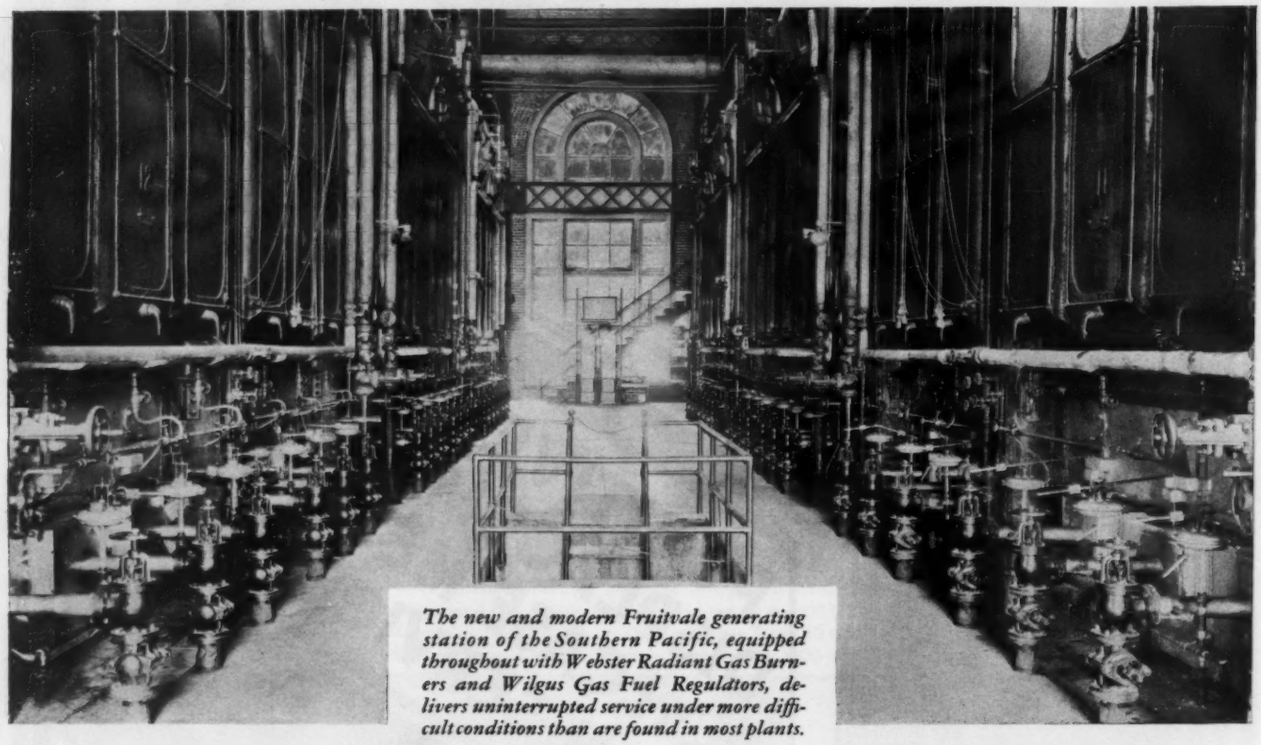

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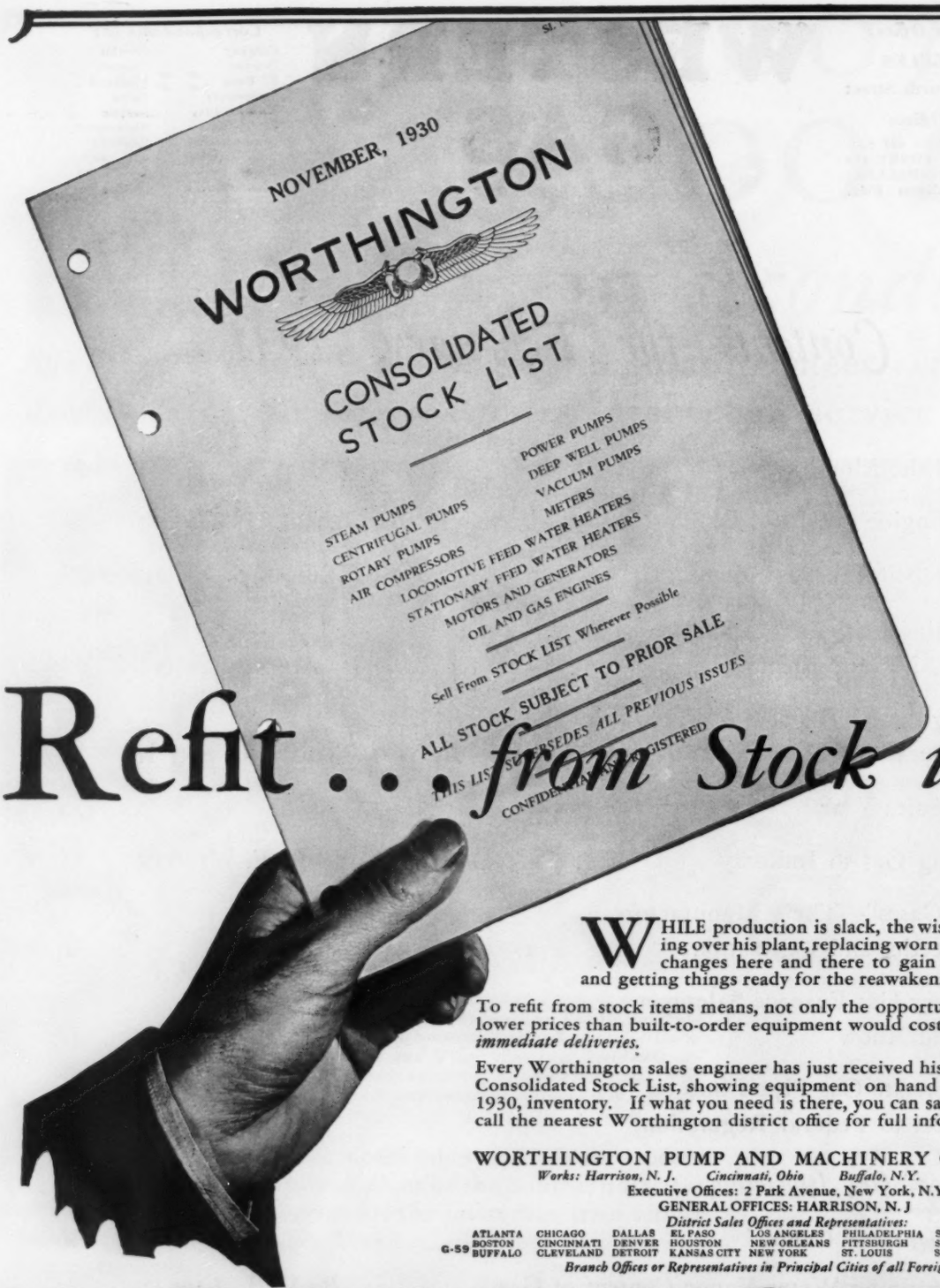

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WHILE production is slack, the wise executive is looking over his plant, replacing worn equipment, making changes here and there to gain higher efficiencies, and getting things ready for the reawakening of industry.

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A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

SAN FRANCISCO LOS ANGELES DALLAS

Review of the Month

VITAL statistics, in the form of earnings statements, sales quotas, construction budgets, fill the January news. Well over a thousand miles of newly projected gas line came to light in the West since January 1. Earnings levels have held up in a degree which must be regarded as highly satisfactory, general conditions considered—and a majority of reporting companies show good gains. In a current editorial feature 10 gas company merchandising departments set sales quotas which average 18.5 per cent higher than those of the year 1930.

Mergers; Operating Changes

Terminating lengthy negotiations, American Commonwealths Power Corp. in January brought nine Canadian utilities into one ownership, to be known as Dominion Gas and Electric Co. Several major operating companies in Saskatchewan, Alberta, British Columbia, are grouped as a result of the merger. Gross earnings of the companies affected were something over 4½ million dollars last year, three-fourths of the income being from natural gas sales.

United Gas Public Service Co. filed organization papers last month, and will constitute the principal operating subsidiary of the United Gas Corp., one of the Southwest's outstanding systems.

Full Calendar

After an end-of-the-year lull in gas organization activity, the calendar is again full. The stage was set last month for a number of important February meetings—Fifth Mid-West Regional Gas Sales Conference, Chicago; Western Metal Congress, San Francisco; Fourth National Fuels Meeting, Chicago. January also saw committees named to set up the Natural Gas Department meeting at Memphis, dated for next May.

$117,000 For Joint Advertising

Gas companies headquartering in Los Angeles advanced plans in January for an ambitious piece of regional cooperative advertising—$117,000 appropriated for the year for an appeal to domestic consumers, by Southern California Gas Co., Southern Counties Gas Co., Los Angeles Gas and Electric Corp.—in newspapers, bill boards, and supplementary activities. The campaign is expected to open in late February.

By-Products Plants In the Offing

Significant for natural gas conservation, as well as for growth of new industry in the West, is announcement of by-products plants soon to utilize natural gas from such areas as Kettleman Hills fields in California, where the gas wastage problem has been a factor for retarding development.

Carbon Dioxide and Chemical Co. will locate a dry ice and liquid carbonic manufacturing plant in Carbon County, Utah, to make a diversification of by-products—ammonia, fertilizer, etc. Shell Co. of California contracted in January with Standard-Pacific Gas Line, Inc., for upwards of 11 million cubic feet daily for its nitrogen fixation plant, soon to be erected at Martinez, Calif. Dudley-Ridge By-Products Co. will build a plant somewhere in the San Joaquin Valley, California, to utilize Kettleman Hills natural gas, making nitrates, dry ice, etc., and generating electricity for wholesale to distributing power companies. First unit of the plant calls for 50 million cubic feet daily, with a second unit to be added.

Pipeliners Will Be Busy in 1931

Looking over the January record in new gas transmission line activity, we note that:

Western Gas Co., on the basis of contracts just arranged with Phelps-Dodge copper interests, is reported to have filed articles of incorporation in Arizona, and to be actively pushing the project announced some months ago for extending lines from El Paso to Douglas. Contracts call for gas deliveries to be made to Douglas smelters by June 1 of this year and new survey work is understood to be now under way. Some equipment contracts have already been let.

North Central Gas Co., Casper, Wyo., projecting a 400-mile line to Nebraska points, began surveys in January.

Oklahoma Natural Gas Corp. last month released word of its Texon-San Angelo, Texas line, a 77-mile 12-inch carrier which will run on in smaller size to Rio Pecos, another 50 miles Construction will begin at once.

(Continued on Page 60)

Capitalize on the Possibilities of

The Gas Engine *as a* Load

By GEORGE H. FINLEY

Managing Editor
Western Gas

IN THE thorough conviction that the natural gas industry is overlooking one of its most attractive and serviceable loads—as demonstrated by the experience of a few companies which have developed this field of gas use to an exceptional point—*Western Gas* is introducing a series of editorial features devoted to the gas engine as a load builder. The aim in view is that more companies shall interest themselves in the possibilities of the gas engine, and take the necessary steps to add gas engine users to their lines.

A series of articles such as this journal has arranged for its future issues is more timely now than at any previous period in the industry, for building gas engine load in any great volume necessarily implies the proper rate structure, which in turn calls for natural gas. And natural gas, thanks to the many transmission line projects which have been consummated in the past three years, is now available to the great majority of western states. Seventeen of the 22 states west of the Mississippi are already on the natural gas map, as are also the western provinces of Canada and points in Northern Mexico. Other areas—Arizona, Idaho, Saskatchewan, the Pacific Northwest—are concerned in projects now developing, and there remains no doubt but what natural gas will penetrate to practically all consumption areas in western America. The South has also come emphatically into the natural gas circle, and sections of the North Central and Eastern states hitherto thought beyond the reach of natural gas, now confidently expect it.

All of this development has a special meaning as applied to the natural gas engine, for no item of gas use can be neglected in producing the volume sales which will make long distance transmission investments pay out in a minimum time. The gas engine is an important revenue builder though it is now ignored to a regrettable degree. In many cases it makes possible an agricultural pumping or industrial load eligible to gas along the route of the transmission line, as well as in its chief terminal markets, and hence is doubly attractive.

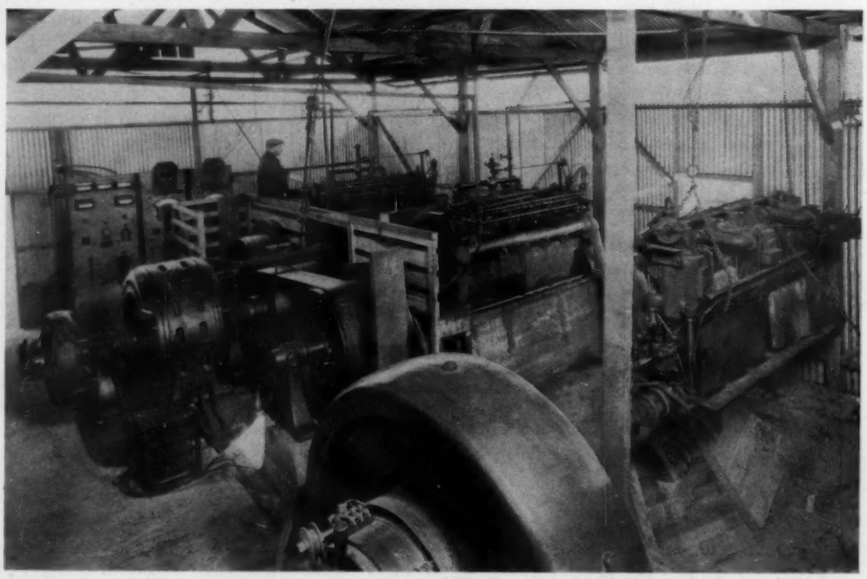
It will be the purpose of the writer in this introductory article to call attention to general aspects of the gas engine load, and to cite the experience of a number of companies which have made beginnings in securing it. These beginnings are impressive in some instances; in others, they show growing interest in the load, and in that sense are important. The industry must examine the gas engine in the light of its possibilities, and not in the light of its present use, for while that in itself is considerable, the future so far outshadows present use as to make it insignificant.

Among articles to follow in the series will come several from company industrial departments, carrying a message for similar departments which are contemplating the encouragement of gas engine sales. Some of them will treat of sales methods and organization. Others will go deeply into individual applications of the gas engine, describing specific installations in different industries. There is much to be done by the industry in educating itself to the technique of selling and maintaining the gas engine, and it is the intention in submitting this *Western Gas* series to make a beginning in this direction. Cordial cooperation, both from engine manufacturers and from those companies which now have gas engine customers, is making this effort possible.

Fields of Use

The gas engine as now developed is an economical, flexible, dependable power plant which may be applied in any use where the load factor is sufficiently high to merit the initial investment. Savings in operation costs may be shown without question against competing fuels or purchased electrical power, if the load factor is right, and later illustration will demonstrate this point in detail. As used on present natural gas systems the gas engine is supplying economical power for:

Pumping water for irrigation. (Water companies and individual irrigationists.)
Pumping water for domestic use. (Municipal water systems).
Ice manufacture.
Electric power generation.
Paper manufacture.
Machine shops.
Laundries.



480 H.P. installed in gas engines at the plant of the Long Beach Steel & Foundry Co., on the lines of the Southern California Gas Co.

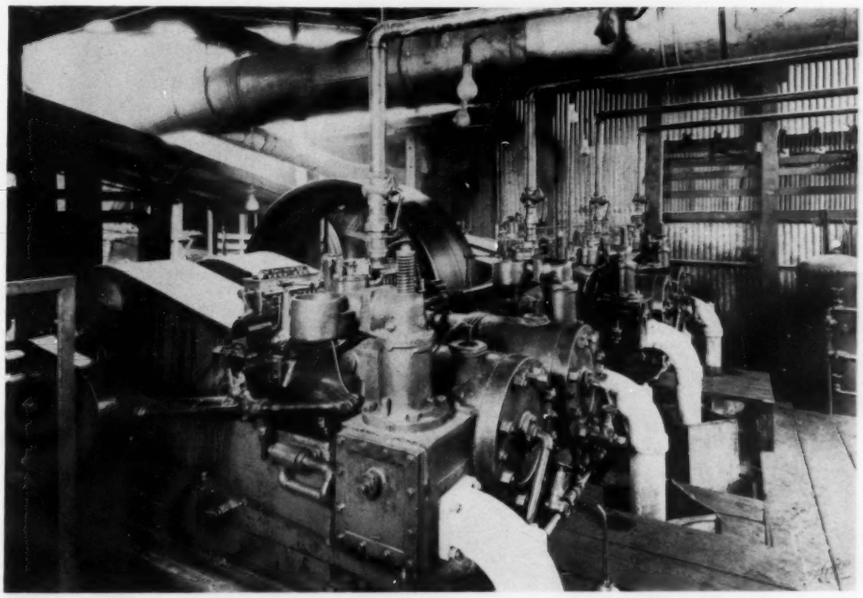
Builder

Brick, tile, glass and other ceramic product manufacture.
Grain mills and elevators.
Cotton gins.
Cotton oil mills.
Flour and feed mills.
Mining. (Lead, zinc, etc.)
Quarries, sand and gravel plants.
Creameries.

The list above is merely suggestive, for the gas engine will supply economical power for driving power equipment in the general industrial field.

It should be noted that no reference is made in this discussion to use of gas engines in oil field operations. There are thousands of oil field installations throughout the country, but no mention is made of this load because it does not require the sales promotion that is demanded in other fields, due to conditions peculiar to oil production.

The uses specified above are mentioned particularly by gas company industrial departments furnishing information to the writer. At a later point in this discussion the experience of several companies is covered in some detail, with reference to types of industries served, rates, amount of load, and other considerations.



A 320-H.P. gas engine plant supplying power for the California Oregon Paper Mills, Los Angeles, Calif.

Attractiveness of Load

Having in mind, then, the hundreds of thousands of horse power required in the West for industry and for water development—power which must either be purchased from the electrical industry or produced by steam, oil, Diesel, or gas engine power—let us briefly enumerate the factors which make it imperative for the gas industry to grasp its present opportunity and capitalize on the gas engine.

High Load Factor: A simple curve showing the long-accepted winter peak and summer slump in gas sales, with the gas engine load superimposed, illustrates the important place this load builder should play in the constant program of evening up the valleys. (See Fig. 1). An important phase of the gas engine load is seasonal, off-peak business, typified by irrigation, ice making, and other uses which have their peak in summer months. Other uses give the gas engine an attractive base load of excellent load factor. Municipal water pumping and many industrial applications offer 24-hour, 365-day use.

Revenue: Average rates for gas engine sales, in the experience of companies pioneering this load, will compare very favorably with general industrial uses. Rates of several companies reporting to *Western Gas* range from 20 to 45 cents per M.c.f.

Sales Cost: Considering the higher revenue attainable through the gas engine, this load can be built at lesser sales cost than can many other classifications of industrial business.

Long Time Use: Long engine life, economy of operation, and the original investment will keep gas engine users on the utility's lines permanently—justifying a fine order of sales effort to put on this type of customer. The life of a modern gas engine may be reckoned at 20 to 30 years, conservatively, and from the gas company standpoint an installation means a consumer—and a satisfied one—for this period of time. To indicate the revenue possibilities, take the case of a 110 h.p. gas engine, costing between $4,000 and $5,000. Working on a 100 h.p. load for 12 hours a day this engine may be expected to consume 1,000 cubic feet of gas per hour, and at

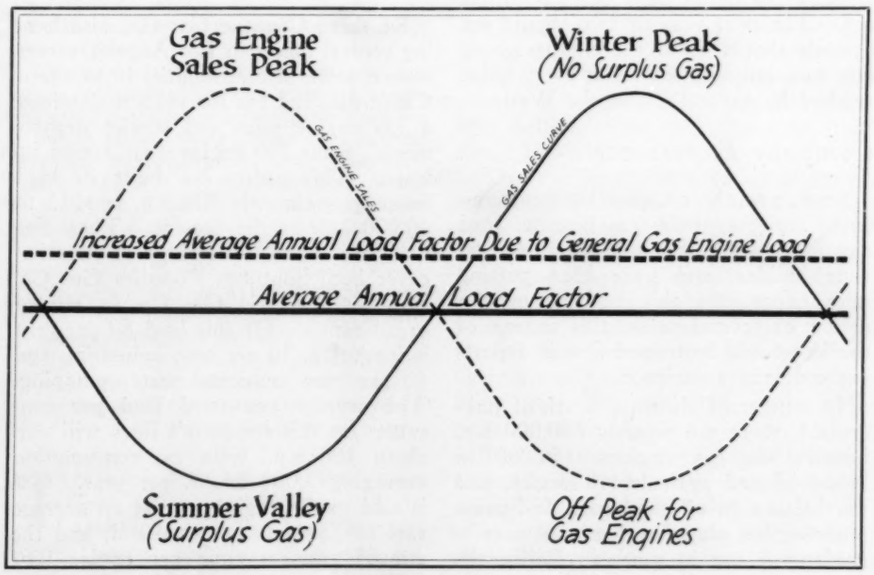
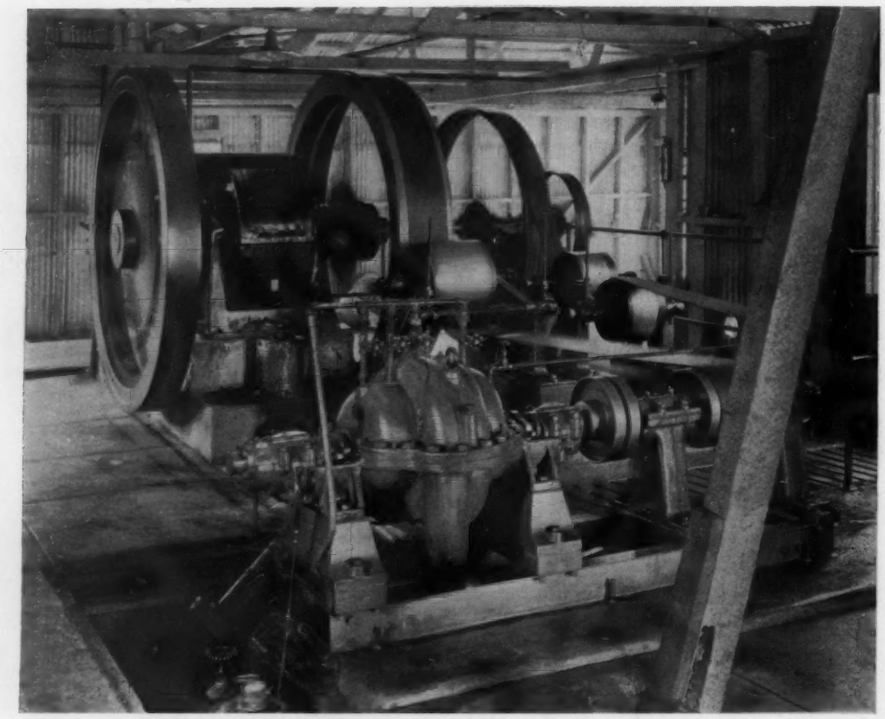

Gas Engine Sales Peak
Winter Peak (No Surplus Gas)
GAS ENGINE SALES
GAS SALES CURVE
Increased Average Annual Load Factor Due to General Gas Engine Load
Average Annual Load Factor
Summer Valley (Surplus Gas)
Off Peak for Gas Engines

Fig. 1. Gas engine sales throw their influence in the direction of evening up the valley in the general gas sales curve.



A typical installation for domestic water pumping, on the lines of the Southern Counties Gas Co. The 80-H.P. gas engine operates both a deep well turbine and a booster pump.

this rate to bring in $3.60 per day, $93.60 per 26-day month, $1123.20 per year, and a total of $28,080 over a 25-year period.

User Advantages

The gas company can go about building its engine load almost with the fervor of a missionary, on the score of savings which the consumer can effect in his power costs. Engines are being consistently sold against less than 1 cent per Kw. hr. electricity at some points in the country, with gas rates averaging around 30 cents per M.c.f. for 1100 B.t.u gas. This is possible only because operating costs with gas are astonishingly low—one-third that of electricity for the irrigation load, for example. More is said of competitive costs, as refers to electricity, oil, and other types of power, at a later point.

Long engine life also appeals to the consumer. Other consumer advantages which might be enumerated are: Clean engine rooms, no necessity for fuel storage, payment for fuel as used rather than in advance, simplicity of engine construction. The installed cost of a gas engine compares very favorably with other types of power, with the exception of the electric motor, and savings in operating costs over the latter will amortize the gas engine investment in two to three years where load factor is reasonably good—leaving the consumer with his engine installation and having paid no more than electric power costs in the meantime.

In order to get a cross section of gas company experience with the engine load *Western Gas* requested certain information of a number of industrial departments, which the writer reports below. While it will be apparent that in most sections only a bare beginning has been made (many gas companies have not a single engine user on their lines), it is again stressed that the gas engine must be examined in the light of its potential use. The next year or two should see literally thousands of gas engines going into load building service at every point reached by natural gas in the West.

Company Experience

Because southern California companies have brought their gas engine load to a point where it is a considerable revenue builder, and have been putting sales effort into this business over a period of several years, this section of the West will be treated first in reporting company experience.

In southern California, south of Bakersfield, there are possibly 600,000 h.p. installed in gas engines—150,000 in industrial and agricultural service, and the balance in oil field use. Irrigation pumping has played a dominant part in gas engine use in southern California. Several other sections of the country have a similar situation—water levels declining in concentrated agricultural areas to a point where power costs become too great in proportion to crop revenue, with the result that land operators must look about for cheaper power. This condition applies to all of California from Sacramento south. Gas engines for irrigation pumping will find use at other points in the Pacific Southwest as natural gas lines take in additional area. West Texas and several other sections of the West where irrigation pumping is done will also use the gas engine in this application. Closely allied to the irrigation use is that of domestic water pumping, and this is a country-wide market for gas engines.

Southern California Gas Co., headquartered in Los Angeles, has 200 engine users on its lines, and a total connected load of 19,761 h.p., with annual sales amounting to about 540,185,000 cubic feet. This company is adding annual revenue in the sum of $163,000 from gas engines. The load is being sold in competition with electric costs which are perhaps the lowest in the country—ranging to 8-9 mills per Kw. hr. in many cases. With overproduction of oil from southern California fields the gas company also faces 70-cent per barrel oil competition.

The following table gives a classification of the Southern California Gas Co. engine users, with installed h.p., gas sales, and revenue shown for each:

Classification	*Installed H.P.*	*Annual Gas Sales Cu. Ft.*	*Revenue*
Creameries	800	36,389,800	$ 8,917.13
Laundries	160	9,293,200	2,142.82
Ice Plants	400	16,627,300	4,103.24
Paper Mills (and generating electricity)	1,440	49,850,700	11,680.18
Irrigation	16,961	428,024,000	136,202.44
Totals	19,761	540,185,000	$163,045.81

Southern Counties Gas Co., also having central offices in Los Angeles, serves several score of communities in southern California, and has for years maintained a gas engine sales and service department. Some 500 engine users are on its lines. This utility has built its load from approximately 700 h.p. in 1915 to 40,000 h.p. at the present. These figures and the following information cover both Southern Counties Gas Co. and Santa Maria Gas Co., a related organization. Of this load 80 per cent is irrigation, 10 per cent industrial, and 10 per cent municipal water pumping. The average connected load per consumer on this company's lines will run about 100 h.p., with gas consumption averaging 3,000 M.c.f. per year. Gas is sold to the engine user at an average rate of 33 cents per thousand, and the annual gross revenue per engine user will average about $1,000.

(Continued on Page 57)

Montana's Natural Gas Resources

By EUGENE S. PERRY

Head of Department of Geology, University of Montana School of Mines, Butte, Montana.

Sketch of natural gas producing areas in Montana

BACK of the considerable array of new gas line enterprises which have come to light in Montana in recent months is that state's rich gas supply, still in its early development stage. In his paper on "Montana Gas Fields," given before the sixth annual convention of the Montana Chapter, Rocky Mountain Oil & Gas Association, held at Great Falls December 12-13, Mr. Perry covers the principal gas areas and states that Montana's total available gas now amounts to nearly 600 million cubic feet daily. Consumption within the state is less than 50 million cubic feet, and that outside the state supplied from Montana is still smaller. Hence the Montana industry is forging ahead to tie in new markets.

Eugene S. Perry

To suggest a few of the projects now maturing, Minnesota Northern Power Co. subsidiaries have already surveyed the route for a line to Minot, North Dakota, gas to come from the Baker-Glendive field. The same company plans a 100-mile line from Shelby to Missoula. Billings Gas Co. has franchise work under way with a view to taking Dry Creek gas to Bozeman, Big Timber and Livingston by a 120-mile line. Montana Power Co. has franchises at Anaconda, Butte, and several other points, which it appears will be served through a 250-mile carrier from Elk Basin. Persistent reports are also heard of proposals to pipe Canadian and Montana gas across the Rockies to northwestern Idaho and cities of the Pacific Northwest.—*Editor.*

THE construction of several pipe lines to convey gas to cities in Montana, North Dakota, and South Dakota, and the recent rush for gas franchises in a number of Montana cities, have focused much interest on the gas fields of Montana. At the present time the gas industry is probably the most active of any in the development of the state's natural resources.

Montana has three large districts that produce gas, the Baker-Glendive district, the Sweetgrass Arch region, and the north extension of the Big Horn Basin of Wyoming. Several gas "pools" are in each of these districts. In addition to these three large areas, several other localities, not so important, produce gas. These are Bowes (Havre), Bowdoin-Saco, Lake Basin, and Hardin.

BAKER-GLENDIVE FIELD

The Baker-Glendive Gas Field in southeastern Montana is along the crest of a sharp narrow anticline 75 miles or more in length and about 2 miles in width. Wells drilled along the crest of this fold have developed flows of dry gas of from 1 to 28 million cubic feet per day. Total daily open flow of this district is reported to be approximately 400 million cubic feet per day from about 100 wells.

The market for this gas is in towns and cities not more than 150 miles distant. Pipe lines have been extended to Williston and Bismarck, North Dakota; Lead and Rapid City, South Dakota; and to Glendive and Miles City in Montana. A carbon-black plant in this locality has recently ceased operations. Only a small part of the available gas is being used, and the field needs additional markets.

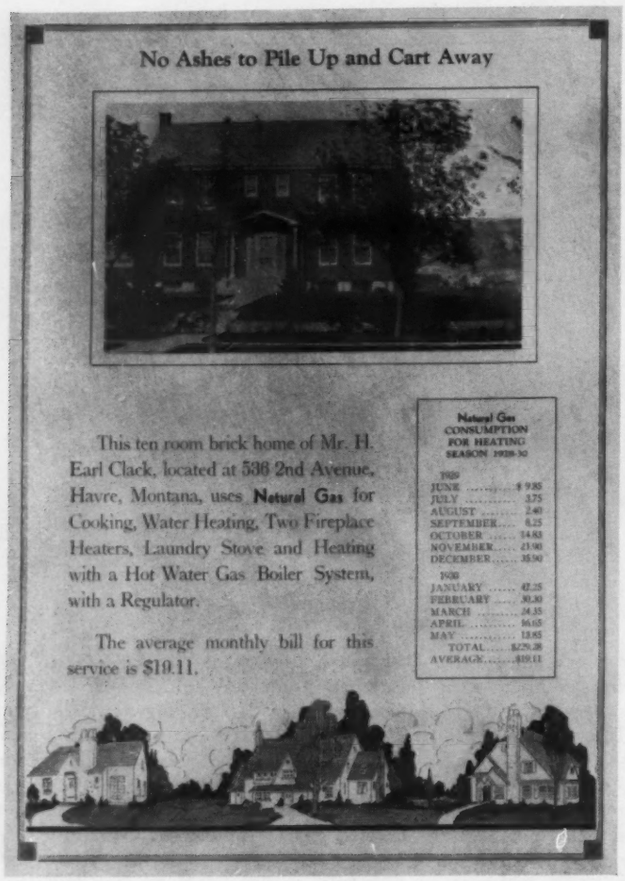
The Sweetgrass Arch region extends from Great Falls to the Canadian border, a distance of 150 miles, and it is 75 miles wide. Several areas are productive of gas in this region, and three areas, the Shelby-Sunburst, the Sweetgrass Hills, and the Cut Bank, are outstanding in importance. Gas was obtained in many wells drilled in the Kevin-Sunburst oil field during its early development. Up to August, 1928, over 250 wells showed an aggregate initial daily production of about 500 million cubic feet. The only market for the gas was local until 108 miles of pipeline carried gas to the city of Great Falls in 1928. At present many of the original gas wells, some of which were drilled in 1923 have ceased to flow. However, a gas field more or less separate from the oil field has been developed south of the main oil territory, and at present about 60 gas wells located north of Shelby have a total open flow capacity of approximately 225 million cubic feet daily. The gas field spreads broadly over the southern side of the Sunburst Dome which is 25 miles across.

Gas has been found at several places in the Sweetgrass Hills area near the Canadian boundary. Seven wells, rather widely scattered, have an average open flow of about 6 million cubic feet each per day and a total open flow of approximately 40 million cubic feet per day. This field is incompletely developed, and no doubt many additional gas wells will be obtained. A pipe line has been extended into this area from the Shelby field.

CUT BANK AREA

The Cut Bank field, discovered in 1930, is so new that little can be definitely predicted as to its future. It promises to equal or surpass the Shelby field. Four wells, which average about 5 million cubic feet each per day open flow, are spaced widely apart, and indicate extensive production. A pipe line has been laid to Cut Bank which so far is the only available market for the gas.

(Continued on Page 68)


No Ashes to Pile Up and Cart Away
This ten room brick home of Mr. H. Earl Clack, located at 536 2nd Avenue, Havre, Montana, uses Natural Gas for Cooking, Water Heating, Two Fireplace Heaters, Laundry Stove and Heating with a Hot Water Gas Boiler System, with a Regulator.
The average monthly bill for this service is $19.11.
Natural Gas CONSUMPTION FOR HEATING SEASON 1929-30
1929
JUNE $ 9.85
JULY 3.75
AUGUST 2.40
SEPTEMBER 6.25
OCTOBER 14.85
NOVEMBER 47.90
DECEMBER 35.90
1930
JANUARY 47.25
FEBRUARY 30.30
MARCH 24.35
APRIL 16.65
MAY 13.85
TOTAL $229.30
AVERAGE 19.11

AT LEFT:

One page from a remarkable booklet prepared for use of salesmen in the Minnesota Northern Power Co.'s "1,000 Campaign". Each page shows a photograph of a gas heated structure, and gives month - by - month heating costs. A broadside reproducing 14 of the pages from this booklet was mailed to the company's entire meter list.

1494 Heating *to a* 10,000

By A. E. SCHWARZ

THOUGH Minnesota Northern Power Co. has been distributing natural gas for only four years, it has built its domestic sales to a high level by intensive sales work. The company's "1,000 Campaign," for house heating load, described by Mr. Schwartz, is a sample of methods followed and results achieved. With a 70 to 80 per cent saturation on house heating in some districts, the sales management fixed its quota at 10 per cent of the total number of meters—and oversold it by almost half in this 60-day campaign.

Minnesota Northern sets its mark at a $125 annual revenue per domestic consumer—and throws in the necessary sales effort to reach it. The company operates natural gas properties in North and South Dakota, Montana and Wyoming, and headquarters in Minneapolis, Minn.—*Editor.*

OUR company had been so busy adding new customers to the new lines we were building, that cold weather was almost upon us before we realized that our annual heating campaign had not been run. Knowing that the average customer delays ordering coal until the last minute, and only appreciates when the thermometer begins to drop, the fact that his winter comfort and supply of fuel must be purchased, we set our campaign from October 1st to November 28th, using the sales slogan, "You pay for the fuel after it is used". We kept a definite purpose in mind, of converting as many users as possible from some other type of fuel to natural gas.

A. E. Schwarz

With only 10,000 meters to contact, and with records of 70 to 80 per cent saturation in some divisions confronting us, we decided that if we could add 1000 new heating customers to our lines, we would be doing a good job. To give the campaign a name, and in order to designate the goal we were shooting at, we put up $1000 in cash prizes and called it "The 1000 Campaign"—(1000 new heating customers and 1000 dollars in cash prizes.) Here we had both a goal to reach, and cash prizes worth working for.

We retail natural gas in 10 divisions, with 41 salesmen devoting their time to gas sales. Our prizes ranged from $125 to $5, with a total of 25 cash prizes for salesmen; $150, $100 and $50 for the salesmanagers, and two prizes of $50 and $25 for division managers. Our quotas were set with the thought that the new divisions would do 70 per cent of the business, while our older divisions would find things a little hard for new business, and we were very much surprised when the campaign ended, to find that our divisions where gas was available for the first time this heating season, did only approximately 50 per cent of the total business. One division, where gas had been sold for heating for 14 years, made 468 per cent of its quota, the one salesman in this division adding 117 new heating customers to the line in 60 days. We might infer from this that a poor job of selling had been done previous to this time, but he had 1263 meters, with a saturation of 76 per cent on heating customers, when the campaign started.

In order to give the salesmen something to work with, we printed a 60-page book showing a photograph of the home of one of our customers on each page, giving name, address and other gas equipment used by customer, with an itemized statement showing bill paid by customer each month, for the entire year from July, 1929 to June, 1930. Customers' homes in 15 towns were shown, these homes being from four to 14 rooms. Apartment houses, hotels, hospitals, schools, stores, creameries, were also shown. All in all, it was a cross section of our heating load. These books were made loose-leaf, so new pages could be added from time to time. The covers were leatherette with gold lettering, which gave a neat and substantial appearance. The successful use of this presentation seemed to prove to us that it was the type of "book of facts" to show to prospective customers.

In addition to this, we picked 14 customers from the book, making up a broadside, of which we printed 10,000 copies, sending it to our entire meter list. Nineteen newspaper ads were prepared, and we started after the business. No special offer was made to the customers, except standard 18 months time, and our standard practice of giving a Ring burner to a customer if he purchased $100 worth of merchandise, (in-

Customers Added Meter System

Commercial Manager
Minnesota Northern Power Company

stallation costs and heat regulators being additional cost to the customer.)

The only rule of the campaign related to a definition of what constituted a "heating customer", which read as follows:

"Any customer installing natural gas in either new or old equipment in a home or place of business; replacing any other type of fuel in old buildings; or installing gas-fired equipment in new buildings, will be counted as a new heating customer."

If the customer was already on the line for water heating or cooking, or both, and had been using some other type of fuel for heating, and by conversion or new equipment became a user of gas for heating, he was considered a new heating customer. (Likewise, a man using a small one-room office as his place of business was considered a new heating customer, if he changed to natural gas from some other fuel.)

The campaign from beginning to end was unfolded to the sales organization through our weekly sales organ, the "Sales Bull", and the employees' monthly magazine, "The Link". The contest was announced in the October "Link" and several teaser notices had appeared in the "Sales Bull" during September. We had special activity on

"Make every prospective buyer glad that he met you"

SALES BULL

Published weekly by the Minnesota Northern Power Co. for its salesmen.

Vol. 1 December 2, 1930 No. 35

1000 CAMPAIGN

Havre, Miles City and Conrad Win the Big Prizes
Black Hills Manages to Gather Majority of the "Cold Cash"

Over the top with 1,494 New Heating Customers in 60 days! That's one for the books! Every Division—every individual salesman—every manager is to be congratulated on the success of the campaign. Only through all of your efforts could this have been put over in the manner in which it was.

We are showing below, the final standings of Divisions, and on the next page, final standings of salesmen with cash prize awards. Checks will be mailed out within the next 10 days.

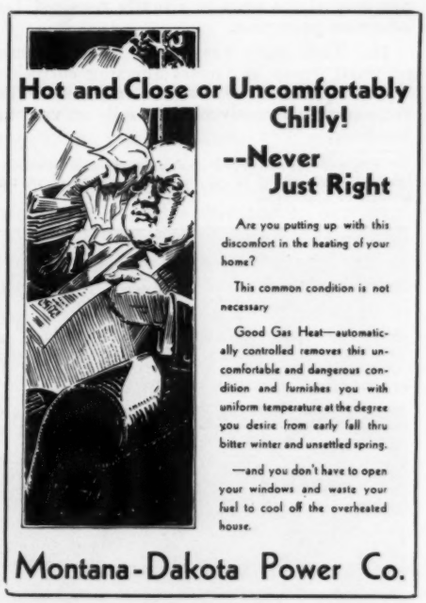
We will give you next month, complete and detailed information on the campaign, as to number of steam, hot water, warm air, conversion, etc., were sold; also the approximate number of cubic feet annual consumption added to the lines by your sales.

Division	Quota	Sales	Pct. Cent.	Cash Prize	Won at
1. Havre	25	127	508	$150.00	E. W. McCarthy
2. Miles City	90	181	451	100.00	O. F. Jewett
3. Conrad	75	198	400	50.00	A. J. Lawrence
4. Malta	20	71	355	50.00	F. C. Gutierrez
5. Black Hills	90	317	352	50.00	C. B. Andrews
6. Glasgow	20	71	355	25.00	
7. Cornelius	90	317	352		
8. Bismarck	20	71	355		
9. Williston	150	358	205		
10. Sheridan	130	253	195		
	75	273	86.7		
	235	58	77.3		
Totals	1,060	166	70.6		
		1,494	149.4		

The continued efforts of our sales organization has again proven itself in the 1,000 Campaign. All credit is due those in the field who have put over the sales, by consistently selling to our customers, the advantages offered by Natural Gas—(The Modern Fuel)—over any other known fuel.

AT RIGHT:

The "Sales Bull" is a weekly "pep-sheet" going to salesmen throughout Minnesota Northern Power Co's divisions.


Hot and Close or Uncomfortably Chilly!
--Never Just Right
Are you putting up with this discomfort in the heating of your home?
This common condition is not necessary
Good Gas Heat—automatically controlled removes this uncomfortable and dangerous condition and furnishes you with uniform temperature at the degree you desire from early fall thru bitter winter and unsettled spring.
—and you don't have to open your windows and waste your fuel to cool off the overheated house.
Montana-Dakota Power Co.

One of a series of 19 newspaper advertisements run during the "1000 Campaign"

various lines of heating apparatus which we sell, each week, giving a special cash prize for all sales that week. For example, during a special boiler week, we paid $2.50 per section for all sales on the featured line of boilers, that week only. Announcements were made in the weekly "Sales Bull", and no salesman knew what line of equipment would count the next week. Among other featured weeks were those on Payne Furnaces, circulating type heaters, Columbus Furnaces and Minneapolis Honeywell Regulators. The added effort on one line of equipment had its effect for two or three weeks in sales.

A report from each division was made up each week, showing name of customer, kind of installation, home or business, type of equipment, and approximate yearly consumption in cubic feet, the last bit of information becoming the

(Continued on Page 60)

Sales and display floor at Havre, Montana, office of Northwest States Utilities Co.—Minnesota Northern Power subsidiary.

Rapid City, South Dakota, sales floor of Montana-Dakota Power Co., another unit in the Minnesota Northern system.

Analyzing *the* Merits *of* Soil Corrosion Survey Work

as Developed for the Amarillo-Denver Line

By WM. THOMPSON SMITH

*Ford, Bacon & Davis, Inc.**

THE relative corrosiveness of the soil at various points along a pipe line right of way may be estimated in advance as a basis for the specification of the degree of protection to be applied in different sections. The most commonly used and generally accepted means of estimation is based upon simple observation of surface conditions. As an alternative, a detailed soil corrosion survey involving simultaneous consideration of chemical and topographical characteristics was first employed in the construction of the Amarillo-Denver natural gas pipe line. The recent inspection of this line at 66 points by the American Gas Association affords a basis for studying the relative merits of the two methods. Consideration of available data leads to the following conclusions:

1. The substantial accuracy of the results of a soil corrosion survey as used by Ford, Bacon & Davis, Inc., is confirmed, for alkali soils.

2. The probable accuracy of such a survey in other soil conditions is indicated.

3. The specification of the degree of protection to be used on a pipe line is more exactly in accord with the actual requirements when based on a soil corrosion survey than when based upon surface inspection alone.

4. The variation from the degree of protection necessary, as indicated by actual inspection after service, tends toward provision of excess coating in the case of a soil corrosion survey and toward inadequate protection in the case of surface inspection alone.

5. Agreement by independent observers as to the degree of corrosiveness of the soil at any location is not absolute even when based on inspection data of pipe after service.

6. It is unsafe to base a decision to eliminate protection at any point on the old method of simple inspection of the surface of the ground alone.

7. It is relatively safe to base specifications of pipe protection on the results of a thorough soil corrosion survey.

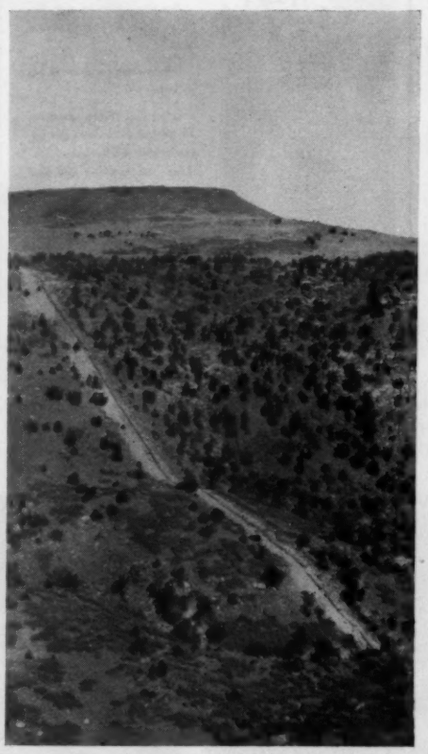
8. Substantial agreement in the comparative rating of soil samples as to relative corrosiveness, although a matter of judgment, is possible by independent workers.

9. Using the data from a soil corrosion survey, substantial agreement is possible in the independent specification of the degree of protection for specific sections of pipe lines.

10. In the instance studied, soil corrosion survey specifications would have entailed an expenditure for pipe protection of 6.4 per cent more than actually required. The actual construction program (although only in part substituting simple surface observation for a soil corrosion survey) expended only 75.1 per cent of the amount actually required for adequate protection.

11. This study has shown no one factor or small group of factors affecting corrosion which may safely be taken as an index of the comparative corrosiveness of soils at various locations.

* Prepared for the 1930 conference on soil corrosion, held at Washington, D. C., under the auspices of the Bureau of Standards.



A varied terrain was traversed by the Colorado Interstate Gas Co.'s Amarillo-Denver 340-mile natural gas line, on which the soil corrosion survey work reported upon in these pages was conducted. The north side of Cimarron Canyon is pictured above, the gas line being laid on a 45° slope.

In December, 1928, at the first of the Soil Corrosion Conferences, the writer was privileged to present a paper entitled "Specification of Pipe Line Protection from Consideration of Soil Analysis and Topography," which, together with a related paper presented by P. J. Richards, outlined the procedure and, in less detail, the theory of the predetermination of soil corrosion conditions along the right of way of the Amarillo-Denver natural gas pipe line. The paper expressed faith in the merit of the method used but likewise specifically denied in the then-existing stage of development, any assumption of accuracy or claim of having developed a definite answer to the basic problem of foretelling the relative effects of various soils in various locations upon steel buried in them.

Absolutely no data were then available either to confirm or discredit the assumptions necessarily made. Such data could only be obtained from actual service records after the passage of time. Lap welded open hearth steel pipe, as used for the Amarillo-Denver line, has shown in similar service in various locations a useful life of from six months or even less to well over 50 years. A number of observers have noted irregular variations in the rate of corrosion of this material and have asserted a number of hypotheses in explanation. Under such circumstances, final and conclusive data are available, if at all, only when the pipe becomes unfit for further service. However, if a sufficient number of examples are considered, an impartial estimation of the extent to which corrosion has progressed, even if only after a relatively short period, will yield data of value. Regardless of the time elapsed in service such information is more impressive and the resulting conclusions more convincing in proportion as the difference in the extent of corrosion increases between the least and the worst affected of the points inspected. The element of uncertainty involved in basing conclusions on even impartial opinion rather than definite physical measurements practically disappears when sufficient difference exists in the extent of corrosion.

Looking south at multiple lines across the Huertano River—Colorado Interstate Gas Co. line. Because of unusually active soil conditions along this route, recent inspection has developed valuable data on the effectiveness of soil corrosion survey work conducted in advance of the line construction.

Early in 1930, the American Gas Association through its representative, Dr. Scott Ewing, requested permission to make inspections at a number of points along the Amarillo-Denver line as part of its general program in the collection of data on the effectiveness of protective coatings in a variety of soils. These inspections were made in April, May and June, 1930, on both bare and coated pipe at 66 points fairly well distributed along the 340 miles of main line. At the locations chosen, conditions were found representing practically every degree of corrosion encountered on this line. As a result of Dr. Ewing's inspection and his courtesy in furnishing a duplicate set of his notes, data such as discussed have become available. Furthermore for the purposes of this present study, these data satisfy the principal requirements of strict impartiality and ample range in degree of corrosion found. A critical study of the merits of the method of predetermination is now possible and is the subject of this paper.

In planning the construction of the Amarillo-Denver line, it was necessary for the engineers, Ford, Bacon & Davis, Inc., to apportion a limited allowance for pipe protection to such sections of the line as a whole as most required protection. For this purpose, determination had to be made of the relative corrosiveness of the soil along the right of way. In pipe line construction prior to this time, either of two methods had been commonly used in making such decisions. The preferred method, unfortunately possible in only very few instances, based the decision as to the amount of protection to be used on a new line upon the degree of corrosion actually experienced on an older pipe line traversing the same right of way. The second method, used in a majority of cases, had been to send out along the right of way a man of general experience with pipe lines who attempted to judge the amount of protection required by simple observation of surface conditions.

The Amarillo-Denver line was the first project of importance in the construction of which an attempt was made to place the estimation of relative corrosiveness on a more logical basis. In this case, Ford, Bacon & Davis, Inc., utilizing the services of J. W. Richards & Son of Denver, Colorado, developed a procedure which is referred to hereafter as a soil corrosion survey. This procedure was based upon a recognition of the probability that no one or no small group of factors could be relied upon as a satisfactory index of the corrosive action to be expected of the soil at any given location. On the other hand, it was recognized that corrosiveness is, to a certain extent at least, affected by a large number of factors of which at different points different ones may exert a predominant influence, while in all probability some factors of unquestioned effect consistently act to such a slight extent as to justify their neglect. In developing a soil corrosion survey procedure the purpose should be the choice of what minor factors may be dropped from detailed consideration rather than the choice of what major factors should be used. It was finally decided that the procedure to be adopted should include the following:

1. Taking composite samples of the soil from the surface to the proposed pipe depth at regular intervals not exceeding 1 mile, supplemented by additional samples at all points not considered to be satisfactorily represented by the nearest of the main group of samples.

2. Analysis of the soil samples and of water extracts obtained therefrom.

3. Comparative rating of these samples according to their analyses based upon theoretical considerations of the probable effect upon steel pipe of the nature and quantity of various compounds found to be in soil.

4. A detailed superficial examination of the entire right of way, providing information upon the following points:

   (a) Slope of surface.
   (b) Direction of exposure.
   (c) Apparent moisture and general drainage conditions.
   (d) Present and probable future use of the surface.
   (e) Kind and amount of vegetation.
   (f) Evidence of local drainage channels.
   (g) Physical character and compactness of the soil.
   (h) Evidences of any probable abrupt changes in the character of the soil.

5. Compilation of climatological data.

6. A concurrent consideration of the data obtained under items 3, 4 and 5 and the specification of the degree of protection required in sections definitely identified by survey station numbers.

The soil corrosion survey of the Amarillo-Denver line was made by representatives of J. W. Richards & Son and of Ford, Bacon & Davis, Inc., working together. Using adequate and identical data, it is, however, possible for those acquainted with the procedure, and with the theory upon which it is developed, to work independently and arrive at conclusions in substantial agreement. This is true not only in the comparative rating of the soil samples based upon their analyses and the analyses of their water extracts, but also in the final specification of the degree of protection to be used for various sections of the line under consideration. Evidence of this statement was obtained by two independent ratings in six classes of 188 soil samples taken along the right of way of another projected pipe line. Of these

Detail of ditch at top of north side of Cimarron Canyon on the Amarillo - Denver line route, with rocky strata much in evidence. The canyon slope is shown in the view on Page 30.

ratings 91.6 per cent were the same or varied by but one class. If the ratings of these samples be made, not in six classes, but in three as in differentiating between degrees of protection indicated as required, the results obtained agree or vary by but one class in 99 per cent of the cases. Similar confirmation as to the agreement between independent protection specifications was obtained in the case of the same projected line.

In the case of the Amarillo-Denver line, a complete soil corrosion survey was made as outlined above. After roughly half of the construction had been completed, under the protection specifications resulting therefrom, it was decided to reduce the expenditure for pipe protection and, for those sections of the line then remaining uncompleted, the amount of protection finally applied was based upon simple surface observations alone in the territory affected and was substantially reduced from that called for by the original specifications. Inasmuch as comparisons made below are based upon the line as a whole, it must be evident that such differences as are shown to exist would inevitably have been greater if the comparison had been strictly between the results of a soil corrosion survey and those of surface observation alone.

Construction of this line commenced December 13, 1927, and was completed June 23, 1928. It was inspected in April, May, and June, 1930. Therefore the average length of service before inspection was two years and two months, a period generally considered too short for any conclusive evidence of relative corrosive action. In this region, however, unusually active soil conditions made possible observations, as recorded by Dr. Ewing, ranging from "Pipe in perfect condition" for one section laid without coating to "At least 100 pits on top up to 0.051 inches. Sides and bottom in same condition" at a point where the pipe had received a single coat of a coal tar base paint applied cold.

The observations recorded by Dr. Ewing of the corrosion found as well as of the condition of the coating where coating had been applied have been carefully tabulated employing so far as possible Dr. Ewing's own words. This information for each of the 66 points inspected, Dr. Ewing's description of local surface and subsurface drainage conditions, and a statement of the degree of protection actually used, together with certain general notes concerning the surrounding territory at each point, have been studied independently by eight men, all of whom have had some experience in either the construction or the inspection (or both) of buried pipe lines. Each of these eight men was asked to give his opinion, with respect to each point inspected by Dr. Ewing, as to the degree of protection which would have proved adequate under the existing conditions. All eight were given identical instructions, being asked to make the following assumptions:

1. A new pipe line is to be laid through the points where inspections were made.

2. Where the soil is apparently not at all, or only very slightly corrosive, pipe may be laid bare. Light protection is effective and adequate in soils of medium corrosiveness. Under any other circumstances heavy protection should be used.

3. The proposed pipe line is to be adequately protected from corrosion. There is no need to save money in construction costs, but, on the other hand, no heavier coating is to be used at any point than is justified by the data at hand interpreted in the light of experience.

This procedure resulted in obtaining eight opinions for each of the 66 inspected locations, or a total of 528 opinions. Even with detailed notes as to actual corrosion in service, the amount of protection required is still largely a matter of opinion which may be far from unanimous. At two locations opinions were found in all three classes. At only 50 per cent of the locations was opinion unanimous. At 12 per cent of the locations there was an even division of opinion. However, at nearly 82 per cent of the locations six or more of the eight opinions were in agreement.

Since no soil samples were originally taken exactly at the points inspected, no definite correlation could be established or disproved between any single characteristic of the soil and the degree of corrosiveness as measured by the 528 opinions. It may be noted, however, that no such definite correlation is evident if the nearest of the original soil samples is considered. There is a decided lack of correlation between degree of corrosiveness and any element of topographical conditions, as indicated hereafter in the discrepancy between the degree of protection called for by the 528 opinions and that actually applied in the construction of the line. This study has developed no evidence pointing to the reliability of any single factor or small group of factors as an index of relative underground corrosive conditions.

Using the entire group of 528 opinions without eliminations of any kind or any process of selection, two sets of comparisons were made:

Opinion based upon observed condition after service versus:

(a) Specification resulting from soil corrosion survey.

(b) Degree of protection actually used in construction.

It should again be noted here, as already mentioned, that the line was in

(Continued on Page 65)

1931 . . . . A Sales Year

1930 Ahead for Many New Business Departments

WHAT are gas company new business departments expecting of 1931? Will the year see a shaving of budgets, paring down of advertising appropriations, a generally cautious attitude toward promotional effort of all sorts? Or will company managements hold up ambitious sales quotas, backing them with the man power and funds which are required in greater measure to produce results equivalent to those achieved in 1929, when the going was easier?

Remembering that 1930 was anything but a sellers' market for the general run of commodities, the casual answer might predict somewhat of a retrenchment in sales outlay for 1931. Judging from general economic conditions, the industry's proportionate share of 1930 sales would be expected to fall far below 1929 levels, and individual companies might be excused for setting up modest goals for 1931.

However, in company with others who have followed the course of 1930 sales effort on the part of gas utilities, *Western Gas* sees no signs of curtailment ahead, but rather, a year of strong selling. The industry rode into 1930 on the greatest wave of merchandising it had seen up to that time. We say "up to that time," advisedly—for it will not surprise us to find 1930 totals comparing very favorably with the boom year 1929 when the books are finally totalled. Certainly this is the case for many individual companies which have pushed their annual merchandise records ahead in the face of the public's tightened purse strings.

What the Sales Managers Say

With a view to rounding out our 1931 outlook, *Western Gas* during the past month addressed letters to a number of sales executives, located at various points in the West, asking information on 1930 accomplishments and 1931 merchandise quotas, and calling for comments on special features of the year's sales plan. Returns to these letters have verified the feeling of optimism left by the splendid sales totals of 1930. It will be remembered that this journal in its issue of May, 1930, presented a gas appliance sales analysis for some 100 utilities in Western America, showing a 50 per cent gain in sales over the year 1928. While it would of course be over-hopeful to anticipate anything like this percentage gain for the year just closed, information already in hand from a number of companies causes us to look upon 1930 decidedly as a year of sales advancement.

And if the plans of leading sales departments may be accepted as setting the tempo for 1931, this year will see the general level of sales quotas raised by several notches.

In the following paragraphs we present a brief sales review and prospectus for several companies, and will allow the reader to piece together the record for himself.

Minnesota Northern Power

One organization which did an outstanding job of selling during the past year was the Minnesota Northern Power Co., operating through subsidiaries in Montana, Wyoming, North and South Dakota.

With approximately 10,000 meters comprising its system, scattered through several states, this company sold merchandise to the amount of $1,154,900, of which $348,896 covered piping and installation charges. With this record at its back the company anticipates that its 1931 quota will approximate $1,250,000. The peak of Minnesota Northern's 1930 sales came in a 60-day house heating sales drive which placed 1,494 new heating customers on its lines—new house heating sales to practically one-tenth of the total meters. Methods by which this outstanding piece of selling was staged are reported in full at another place in this issue in an article contributed by A. E. Schwarz, the company's commercial manager. During the year there were sold 3,257 room heaters of all types; 2,249 gas ranges, 1,899 water heaters, and 435 furnaces. Having already achieved a high degree of appliance saturation among its customers, this company still finds it possible to set a 1931 quota in advance of that of the preceding year.

Kansas Pipe Line & Gas

Another company which has built its sales volume to a high point in 1930 on a system of comparatively few meters —about 15,000—is the Kansas Pipe Line & Gas Co., headquartered at Salina, Kansas. Net sales totalled $549,428. For the year 1931 the company has budgeted to sell $550,000 worth of merchandise. On the 1930 sales list were 2,022 space heaters, 1,803 central house heating installations (including conversion burners and gas designed furnaces and boilers), 1,255 gas ranges, 748 automatic water heaters. The new quota calls for 1,600 space heaters, 1,880 househeating jobs, 1,400 ranges, 950 automatic water heaters and 95 incinerators. Having tied into its system a number of new gas towns, the company is entering 1931 with 19,000 meters and therefore expects to outdistance its quota considerably. Accompanying its merchandising effort this utility last year conducted an appliance servicing campaign.

Seattle Gas Company

In the Pacific Northwest some remarkable selling is in progress, to continue throughout 1931. Seattle Gas Co., which in 1929 established a total of $259,776 for its 60,000 meters, in 1930 brought its sales to $400,000 gross, and aims at $600,000 for its current annual quota. The sales quota has been increased approximately 50 per cent in all appliance classifications, and the Seattle company plans a concentrated drive to revive dead services, secure new customers on present mains, and replace obsolete equipment now in use. A special program is under way for automatic house heating. Weekly full page advertising and publicity space is to be used.

Among the Seattle company's 1930 sales were some 3100 cooking appliances and 5431 other appliances, including water heating, refrigeration, house heating, and miscellaneous. Refrigerator sales were a highlight, coming to 300 for the year—as compared with a total of 3 gas refrigerators on the company's entire system at the first of the year.

Portland Gas and Coke

Registering a gain over 1929, Portland Gas and Coke Co. set up $480,486 in 1930 gross sales. A 1931 quota of

$487,000 (after sales adjustments) is the goal for Portland salesmen this year. Excellent gains were shown in 1930 for ranges, automatic water heaters, and refrigerators, as follows:

	1930	1929	Increase
Ranges	2,606	1,613	993
Automatic waterheaters	201	123	78
Refrigerators	469	327	142

General employee sales showed a 2.5 per cent gain for the Portland company —$93,949 in merchandise sold resulting in 1930 from employee cooperation, either through direct selling ($11,641) or submitting prospects for regular salesmen to close ($82,308).

Coast Counties

Coast Counties Gas and Electric Co., serving a number of northern California towns, at the beginning of 1930 set $147,000 as its merchandise quota. It ended the year with sales of over $220,000 and will work toward $297,000 in gas appliance sales for 1931. Last year the company ran a load-building contest resulting in a large volume of house heating equipment sold. Special campaigns will feature each month of 1931, and the company already has a water heater campaign making good headway toward picking up the load which will drop off when warmer weather comes. This campaign will run into the middle of March.

P. G. and E.

During each of the past two years the Pacific Gas and Electric Co. has more than doubled gas appliance merchandise sales of the year previous on its extensive northern California system. The record runs as follows: 1928—$470,000; 1929—$1,013,971; 1930—$2,127,737. Worthy of particular comment in P. G. and E. selling of the past year is the sale of 12,331 conversion burners, which passed the company's 10,000 by a large margin. It is the P. G. and E.'s aim to double the use of natural gas for house heating during 1931, and sales budgets have been geared up accordingly. A more complete report on this company's sales activity will be found on another page.

Southern Counties Gas Co.

An aggressive year of selling was conducted by Southern Counties Gas Co., Los Angeles, Calif., with $731,333 in net merchandise sold. This figure includes installation and house piping, but deducts allowance for trade-ins. The sales goal for Southern Counties in 1931 has been established at $851,000. Individual quotas in this amount will include 3,000 ranges, 700 refrigerators, and 2,500 automatic and storage water heaters. During 1930 the company sold 635 refrigerators, and 1,761 automatic and storage water heaters. A six-week range campaign at the end of the year netted 379 sales, with 12-month range sales at 2,500. The special range campaign will be described next month by Clyde H. Potter, commercial manager for the company. Emphasis was laid during the year on sale of central furnaces and other types of permanently connected heating appliances.

Southern California Gas Co.

While full information on 1930 sales were not yet available, Southern California Gas Co.'s 1931 quota is $900,000, an increase of $100,000 over the merchandising total (including installations), last year.

Capital Gas and Electric

Sales compilations for 1930 were not complete for the Gas Service Co. at the date of *Western Gas'* inquiry, but statements from company sales executives indicate that this important group of Midwest gas distributing units will make every effort to exceed the 1930 sales showing. Details can be given for one of the company's important subsidiaries, Capital Gas and Electric Co., serving Topeka, Kan. Gross appliance installations for 1930 represented the sale of $349,952, which figure is within 1 per cent of the year 1929, the largest year in appliance sales in the company's history. Despite a light heating season, more house heating appliances were sold in 1930 than in any previous year, amounting to 1,300 installations.

Public Service Co. of Colorado

Sales figures applying to the Denver portion of its system only, are given by the Public Service Company of Colorado, and indicate that the pace will be stepped up by that utility—$1,000,000 being the announced quota for 1931 merchandise sales. Total appliance and installation sales last year in Denver reached the sum of $902,976.

All-gas househeating jobs to the number of 2,769 were included, bringing Denver's grand total of domestic heating installations to more than 10,500. One home out of every five and one-half uses gas as its exclusive fuel, for all purposes including house heating.

Gas sales were increased by 38 per cent over those of 1929 to Denver customers. During the three summer months of 1930 residential gas sales were increased 23 per cent over the same months of the year previous. Specialization on summer load was one of the keynotes of sales promotion in Denver for all divisions of the sales department, resulting in an over-all increase of 28 per cent for all classes of gas sales in these months.

Public Service Co. of Colorado also reports 2,414 water heaters installed, 1,800 of them being of automatic type. Also on the year's sales list were 1,252 fireplace heaters. Another item was the converting of 29 churches from coal to gas heating.

Throughout 1931 parallel campaigns will be maintained in domestic house-heating and other domestic classifications; also in commercial and industrial fields, with emphasis upon summer load building. The company's househeating division will maintain a special crew of men to improve heating service on some 6,900 conversions (non-gas designed installations), selling these consumers gas designed equipment, additional warm air ducts, chimney lining, ceiling insullation, radiators, fireplace heaters, incinerators, etc.

Central Ariz. Light and Power

A new year merchandise sales quota for the Central Arizona Light and Power Co., Phoenix, Ariz., has been placed at $60,000, a 10 per cent raise above the $50,000 in 1930 sales. Installation and jobbing charges are included in these figures.

The year will see concentrated effort on automatic water heaters, which will be campaigned on a 12-month basis. A three-month house-heating drive will begin with the fall season, considerable newspaper advertising and direct mail support to be placed behind both house-heating and water heater efforts. Three minor campaigns on gas ranges, in addition to a major campaign which the company runs on this appliance every November, will also feature the year.

It is easy in such a recital of sales totals as the one above, to lose sight of the effort, expenditures and sales planning which underlie the achievements. If 1930 compares favorably with 1929 in merchandise sold, as we predict that it will, the industry may find the explanation in its redoubled sales effort. And it will be on the basis of building up man power and sales appropriations that even larger quotas will be met in the present year. Sales plans of the several aggressive merchandising departments, which have been cited above, augur well for 1931 results.

Advertising Gas *to* Industry

By JOHN F. WEEDON

Superintendent of Advertising
Peoples Gas Light and Coke Company,
Chicago, Ill.

WITH the approach of natural gas to principal industrial centers of the Middle West, the efforts of such organizations as the Mid-West Industrial Gas Sales Council assume new importance. The council met on January 16, at the Palmer House, Chicago, in its annual session. One of the program features was the address on industrial advertising, by John F. Weedon, printed in these pages. The author applies his remarks particularly to the cooperative industrial campaign which the American Gas Association has had under way for some time. His discussion would refer equally aptly to the industrial unit of the Pacific Coast Gas Association's cooperative campaign, which is proceeding along much the same course outlined by Mr. Weedon.

The author of this discussion should know whereof he speaks, having spent some 41 years with the Peoples Gas Light and Coke Co. of Chicago, the last 16 in advertising activities. Incidentally, Mr. Weedon on the basis of his considerable period of service, tells *Western Gas* that "Gas men, like Kipling's soldiers, never grow old; eventually, they simply fade away."—*Editor.*

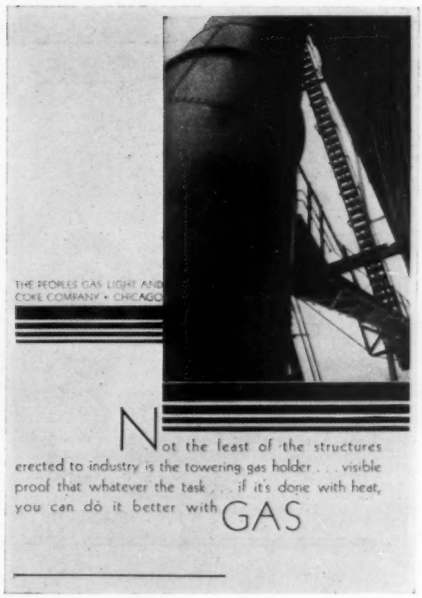
SOON after the Industrial Gas Section of the American Gas Association came into being, some seven or eight years ago, it was at once seen that a national tie-up was necessary. Manufacturers all over the country had to be made aware that gas was a live competitor, for the crude fuels they were then using.

Unlike the British Commercial Gas Association, which puts out a very extensive, and probably a very expensive, campaign for gas, in all its phases of usefulness, the American Gas Association has never done any national advertising. With the exception of a comparatively small fund used for this purpose by the Industrial Section, it does none now. Advertising on a large general scale is, so far, not one of its functions.

But when it became apparent that manufacturers in various parts of the country were beginning to use gas, in large quantities, in the fabrication of a great variety of articles, it also became apparent that it was necessary to spread this information to other manufacturers in these respective lines of business. Consequently a small fund was allotted, $35,000, for purchasing space in trade journals.

J. F. Weedon

Trade Journals are now divided into two types, the "verticals"—those dealing strictly with one form of industry; and the "horizontals"—those covering many industries. We find that the "horizontal" group is much more prolific in bringing inquiries than the "vertical" group, nevertheless there are some excellent "vertical" trade journals which must be considered in advertising gas to industry.


THE PEOPLES GAS LIGHT AND
COKE COMPANY • CHICAGO
Not the least of the structures
erected to industry is the towering gas holder . . . visible
proof that whatever the task . . . if it's done with heat,
you can do it better with GAS

Exploiting the gas industry's service facilities in the modern manner, in industrial gas advertising "copy."

Since the Industrial Section of the A.G.A. started its advertising campaign the appropriation has grown larger. For 1931 and 1932 we have allocated $75,902.20. This amount will be used to prepare copy and to buy space in eight horizontal publications and 18 vertical, and five college publications. We believe where colleges have engineering courses, that it is wise to start early and teach the young engineer the merits of gas fuel.

In making up our list of publications we were guided by data collected from various sources, and particularly from the U. S. Census of Manufacturers. We discovered, among other things, that 95 per cent of all the industrial gas consumed was taken by seven lines of industry. Arranged in the order of their importance to us, these were as follows:

Food Products.
Iron and Steel Products.
Chemical and Allied Products.
Ceramic Products.
Non-ferrous Products.
Machinery.
Hotel and Restaurant.

With this list before us we started to select the trade journals which seemed most likely to reach the people engaged in these industries.

In addition to advertising space, bought and paid for, the Industrial Section has a very active writer of industrial gas news stories. These are taken

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General Outdoor Adv Co
International Harvester Company uses Gas—
You can do it better with
GAS
The Peoples Gas Light and Coke Company

One of the Peoples Gas Light and Coke Co.'s illuminated boulevard boards, carrying the message of gas to industry

TABLE NO. 1

Property	Ethane	Propane	Normal Butane	Normal Pentane
Boiling point	−127°F.	−48°F.	33°F.	97°F.
Heating value				
B.t.u. per cu. ft. of gas at 60°F.	1,782	2,575	3,350	.....
B.t.u. per lb.	22,200	21,600	21,300	21,000
B.t.u. per gal. of liquid	.....	96,000	107,800	113,200
Lbs. per gal. of liquid at 32°F.	.....	4.444	5.06	5.39
Vapor pressure				
Temperature		Atmospheres		
−48°F.	6.8	1.0	0.15	0.02
0°	16.3	3.0	.59	.11
+32°	24	4.9	1.0	.24
70°	38	9.1	2.2	.62
100°	.....	13.8	3.5	1.05
150°	.....	25	7.1	2.4
Temperature		Lbs. per sq. in. gauge		
−48°F.	85	0	negative	negative
0°	225	29	negative	negative
+33°	338	57	0	negative
70°	544	119	18	negative
100°	.....	188	37	0.7
150°	.....	353	90	21
Critical temperature (above which gas cannot be liquefied by compression)	90°F.	204°F.	307°F.	387°F.
Specific gravity of gas (air = 1)	1.05	1.56	2.1	2.6
Volumes of air required for complete combustion of 1 volume of gas	16.7	23.8	31.0	38.2

"Bottled" Gases

Their Manufacture, Properties and Utilization

WHILE distribution of liquefied petroleum gases in "bottled" form to domestic consumers in isolated localities has been developing into a sizeable industry during the past five years or more, many phases of the industry's growth have passed unnoticed by gas men. The Bureau of Standards in its Letter Circular No. 292, issued in December, 1930, has brought together some widely assorted facts on the various liquefied petroleum gases, dealing with the place which each occupies in present use. Because of the close relation which "bottled" gas has to natural and manufactured gas distribution, the following extracts from the paper are presented.—*Editor.*

NATURAL gas and petroleum as they occur in nature consist of mixtures of many hydrocarbons, the compositions of which vary in a regular manner, the first six members of the series being methane, CH_4; ethane, C_2H_6; propane, C_3H_8; butane, C_4H_{10}; pentane, C_5H_{12}; hexane, C_6H_{14}. In the case of butane and higher members of the series different arrangements of the atoms in the molecule are possible and cause slightly different properties. Ordinarily these different "isomers" are not separated, the only common exception being that "isobutane" is sometimes separated from "normal butane."

Methane, the principal constituent of natural gas is a so-called "permanent" gas, and at ordinary temperatures cannot be liquefied by applying pressure, no matter how great. It is nearly as hard to liquefy, by a combination of great pressure and low temperature, as is air. Hexane, at the other end of the list given, is a liquid which boils at 69°C (156°F) and is one of the principal constituents of ordinary gasoline. Gasoline itself is a mixture containing, in the main, hexane and still higher members of the hydrocarbon series, but sometimes having appreciable amounts of pentane. The compounds intermediate in composition and properties between methane and hexane are those with which we are concerned as constituents of commercial "bottled gases."

Ethane can be liquefied by pressure alone at temperatures as high as 32°C (90°F), but if metal containers are to be filled with the liquid they must be of excessively heavy construction to be safe at temperatures to which they would be frequently exposed if made an article of commerce. Ethane is, therefore, seldom distributed alone and is of importance in this discussion only as its presence in solution in propane and butane affects their properties.

Propane is a gas at atmospheric pressure at all temperatures likely to be encountered in the United States, but can be liquefied by moderate pressures and is safe in a container of reasonable strength. Under practically all probable conditions of domestic use a cylinder of liquid propane will, therefore, deliver a continuous supply of gas at a pressure ample for its effective utilization. Normal butane boils at about the freezing point of water and, since its evaporation cools it somewhat, its liquid cannot be made to supply gas at a satisfactory pressure unless the surroundings of the container are at a temperature considerably above that point. Isobutane is slightly more volatile than normal butane; pentane boils at about 36°C (97°F) and is, therefore, a liquid at atmospheric pressure within the usual range of indoor temperatures.

Several of the characteristic properties of the hydrocarbons from ethane to pentane are listed in Table No. 1.

These products in liquid form in the cylinders are not explosive except as any other confined gas, carbon dioxide or ammonia for example, is explosive. If a cylinder is heated the pressure increases, and in case one is in a fire it will eventually rupture with the effect of a boiler explosion, and will suddenly release a large amount of combustible gas, unless a safety device first relieves the pressure. Mixtures of the gas with air will also burn with explosive force just as in the case of any other combustible gas. The material is not explosive by itself, however, in the sense that acetylene is; and it is probably as safe to use with proper equipment as any other form of fuel. These petroleum gases are not poisonous. They are heavier than air and tend to flow along the ground when released in quantity instead of rising as ordinary manufactured fuel gas or natural gas does.

Manufacture of the Liquefied Petroleum Gases

The natural gases which constitute the principal source of the liquefied petroleum gases have been used for many years as a source of "natural" gasoline.

In separating the natural gasoline from natural gas at the well, the higher hydrocarbons, pentane, hexane, etc., which were wanted as gasoline were accompanied by more or less of the lower hydrocarbons, propane and butane, which were not wanted because they made the gasoline too volatile. Originally the natural gasolines were allowed to "weather" that is, the dissolved propane and the

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What Every Gas Furnace Salesman Should Know . . . . . .

By BERT SCOTT

Sales Manager,
Payne Furnace & Supply Company

Recommendations on gas furnace sales technique, as made in the present discussion by Mr. Scott, come from a background of practical salesmanship of the commodity in question. While there are those who hold that the furnace salesman's sole function is to sell, and not to engineer his jobs, Mr. Scott brings arguments to demonstrate that the salesmen must possess a thorough knowledge of good furnace heating engineering in order to make a success of their sales work.—Editor.

LEADING up to the actual sale of gas furnaces to a prospective user, there are several definite steps to be followed closely, in order that the best presentation be made and the proper follow-through to the point of closing be respectively in order.

In districts where gas is not the prevailing fuel or where it is being introduced, the first step is, of course, to sell the idea of the advantages in the use of gas. If gas is comparatively reasonable in cost, this first step should not be difficult for gas as a fuel for heating has so many outstanding virtues to recommend it.

A few of many reasons which the gas furnace salesman may stress follow:

Cleanliness: Freedom from dust, gas and smoke; no daily trips to the basement for firing or taking care of the ashes; eliminating the tracking of soot and basement dirt up into the house, which causes expensive cleaning bills; the elimination of coal or oil smoke, which ruins decorations and draperies and results in considerable expense that should rightfully be charged to the cost of heating.

Flexibility: The ability to reconcile the heating problem to individual living requirements in different parts of the dwelling, such as by the installation of several small furnaces in different locations in the basement and connected to different rooms or logical suites of rooms, with controls placed in these rooms, together with a master control located at a central point, thereby meeting the requirements of individuals with separate heating plants.

Economy: The economy of operation directly resulting from this unit idea of distribution is a big factor, especially in moderate climates where different parts of the home may be heated independently, without the discomfort of being subjected to drafts of cold air from adjoining unheated rooms. Moreover, the shortening of basement leader pipes by placing the furnaces at various points in the basement should be given consideration for the reason that short leader pipes produce much greater register efficiency. In the final analysis, register efficiency is the basis on which economy of operation is computed.

Fuel Supply: The fuel supply in using gas is always constant and is not paid for until after it is used. It therefore does not necessitate the usual preparedness of investing in an entire season's fuel supply. Instead it may be anticipated in the monthly budget.

This first step in the sale is the thin end of the wedge which is to open up the way to the remaining steps. Its presentation is of vital importance and should receive serious consideration. While it is good practice, generally speaking, to make a sales talk flexible, in order that objections or questions by the prospect may be discussed intelligently, yet in this first step a memorized "cut and dried" presentation of the salient reasons for the preference of gas over other fuels has been found to produce very good results. This introduction, however, should not be a mere statement of facts, but rather should be made interesting to the point that it will appeal to the prospect's desires for his family's comfort and welfare. From a standpoint of health, the use of a system that delivers only pure, fresh warm air, in large quantities into the rooms, thereby creating an ever changing atmosphere, conforms to the modern health standards. The elimination of drudgery in connection with antiquated methods of heating, together with the flexibility of individual controls further recommends gas fuel, this as a better method of heating. It is well to repeat that this introductory step is of such vital importance and the sale depends so much upon its proper presentation, that the salesman cannot put forth too much effort to perfect himself in all details.

We will now assume that the prospect is sold on the use of gas as a fuel for heating and that he has already become a prospect for a gas furnace system. Until the salesman analyzes the requirements and their subsequent solution, he still has nothing to sell.

The second step in the sale is to analyze the requirements of this particular problem and work out the proper solution. The success of this step depends entirely upon the fundamental knowledge of warm air heating, possessed by the salesman and, without a doubt, is the most important part of the sale. Unlike the first step, it cannot be a memorized "cut and dried" operation, as each individual installation presents a different problem. The solution of these different problems require a background of knowledge of that which constitutes the best practice in warm air heating in general and its adaptation to gas furnaces in particular. To make a sale without the proper analysis of the requirements, the salesman would be imposing on the confidence of the customer in the first place in the event that through faulty engineering or the lack of any engineering whatsoever, the furnace does not function properly, and he would also impose an obligation on his company of specific performance of the guarantee, which might cost considerable to fulfill and at best will leave in the mind of the customer the thought that he should have purchased from someone who knew his business, or left the old system as it was.

From the gas company standpoint the profitable distribution of gas depends not so much on the initial sales of the appliance as it does on the satisfaction accruing to the user of the appliance and his continuous use of gas. More especially is this true of the basement heat-

ing system for reason that the heating system consumes more gas than the combined consumption of other appliances in the house; hence, it is subjected to greater scrutiny and criticism from the user.

The basement gas furnace in residential districts is conceded to be the greatest potential load builder. However, the successful sale of furnaces requires more intensive training and experience than any other appliance in this field, including direct steam heating. The principal reason for requiring this knowledge and experience is that gravity heating systems operate under a condition where the only motive head is the pressure difference caused by the difference in density or weight of the cold air on one side and the warm air on the other side of the system, which entails not only the correct design of fittings, proper pipe sizes, but a balance in the general design.

Sell the Whole Heating Installation

Many furnace salesmen build their sales talk around some particular part of the system, such as the burner, valve, furnace construction, etc., and do not treat the system as a unit, functioning as such, with burners, valves, etc., as component parts, none of which is complete without the other.

This brand of sales presentation may be productive of results in some instances, yet for universal use it fails to click and should therefore be discouraged. In the process of the sale, the salesman using this method nearly always falls into the rut of comparing so called outstanding features of his product, with similar features of competitive lines, which may be practically unknown to the prospect. However, the prospect's interest is aroused to the point that he desires to see the competitive equipment and make his own comparisons.

The voluntary mention of other equipment by the salesman usually conveys to the prospect, that, if worthy of mention, it must surely be a factor and is at least worthy of his consideration. Thus, an immediate decision and the possible closing of a sale is deferred.

As compared with this comparative method of selling, the better way is to treat the heating system as a well balanced unit, consisting of burners, valves, construction, etc., with each part the best of its kind and without the stressing of outstanding features.

With this type of presentation, the prospect begins to see the system as a whole, which is designed to give him the ultimate in heating service and comfort. In making great claims for individual parts of the system, the prospect will be inclined to look at the system as a complication of different units, especially if he is of an analytical turn of mind, and will commence to look for discrepancies, for it is good logic to assume that if there are some especially strong points, there may be some equally weak that of course would not be mentioned.

Under such conditions the prospect does not wax warm over the proposition and will usually ask for time in which to consider before making a decision.

Importance of Distributing System

It has always been standard practice among furnace salesmen to place the obligation of heating the house on the furnace, for the reason that the sales talk usually revolves around the furnace, stressing the welded construction, fire travel, kind of material used, etc., until the prospect sees the furnace as really the heart of the heating system and, if the system functions properly, the credit is given to the furnace and if it does not function properly the furnace likewise is discredited in the opinion of the user. He is not to blame for his deductions in this matter, inasmuch as he was led by the salesman to believe that the furnace was really the only important part of the system.

The following assumpions will show the error of building the sale entirely upon the furnace.

We will connect to a well-designed and well installed distributing system, with pipes, registers, etc., a furnace of known mediocre performance. Past experience has proved to us that in nine cases out of 10 the installation will be satisfactory to the user. In this case, the heart of the heating system was not the furnace but rather it was the distributing system. In the event that the user is not satisfied with the results of this system he can, by taking out this mediocre furnace and installing a first class furnace, have a first-class job in every particular.

On the other hand, we will connect a furnace of known unequalled performance to a poor distributing system. We have and always will have a poor heating plant, unless additional expensive equipment such as blower, motor, etc., is installed to overcome the deficiencies of the installation that exist.

The point we are endeavoring to make is that in warm air heating plants, each part is so closely related that one part will not function properly without like operation of the balance of the system—and that selling furnaces without first determining the requirements and reconciling these requirements to fit a given condition is bad business and should be discouraged.

To make the selling of gas furnaces worth while, the salesman must possess the fundamental knowledge of that which constitutes good warm air furnace practice, together with a fair knowledge of building construction.

In designing a heating plant for a new building, where architects plans are to be analyzed and recommendations made for the correct installation thereof, before a building is actually built, the knowledge of building construction is very essential in order that the correct installation be intelligently designed on the plans. This service of engineering, if correct, creates in the mind of the architect, a confidence in the salesman's ability to work out his heating problem to the extent that he will specify his equipment.

Knowledge of good furnace practice is doubly essential in the case of changing out an existing installation of faulty design, for in addition to being able to analyze the requirements, the salesman should be able to pick out the discrepancies that exist, such as incorrect design of fittings, irregular piping in the distributing system, and other irregularities occurring in the plant, so that when the new furnace is installed, it will be able to operate under most ideal conditions.

There is no surer way of destroying confidence in a product than to disregard possible corrections that should be made in an existing installation and connect the furnace to the system without previous study of the requirements. The user is able to make an exact comparison of results of the new and old furnace, which may be in favor of the old furnace. Especially is this true if the old furnace were a coal furnace, for due to the ability to create higher air temperatures with solid fuel, the old furnace may have been able to overcome some of the deficiencies in the piping and restricted throat areas by delivering air with a greater B.t.u. content.

In cases such as this, any alibi comes too late to regain the lost confidence. Moreover, the analysis and corrections must still be made, in order to make good the guarantee of specific performance of the contract.

Compile Price List of Equipment

Inasmuch as gas companies in most instances do not make their own installations, the salesman should, with the aid of the installer, compile a retail price list of items, which go to comprise a complete heating system, such as the following:

Furnaces, including cost of setting up and connecting to vent.
Registers, boots and boxes of different sizes.
Warm air leader pipe and riser pipe.
Aircell asbestos pipe covering.

(Continued on Page 52)

Shall Interstate Gas Pipe Lines *be* Subject *to* Federal Regulation

THE bill introduced by Senator Arthur Capper (Kansas) on December 3—"to regulate interstate commerce by pipe line agencies operating in the purchase, production, distribution, sale, or transportation of natural gas and artificial gas"—has focused attention upon another phase of the recurrent federal regulation issue. And while there is every reason to believe that the bill (S. 5030) will be subject to material working over, or will be replaced by other measures of similar intent before it reaches the Senate floor, its provisions are of interest. Briefly reviewed, the bill would:

Create a Federal Gas Pipeline Commission, of three members, to be appointed by the President, who are to have no other business, and are to receive salaries of $10,000 a year. The commission is authorized to obtain engineering assistance from the Army, and from the Departments of Interior and Agriculture.

The commission is given "full power, authority and jurisdiction to supervise and control the purchase, production, distribution, sale and/or transportation of natural or artificial gas by pipeline agencies."

Concerns engaged in or engaging in the activities mentioned, in interstate commerce, must obtain from the commission certificates of public convenience and necessity.

Every pipeline agency subject to the act would be required "to furnish reasonable, efficient and sufficient service and to establish just and reasonable rates or charges and to make just and reasonable rules and regulations."

The commission is given the duty of investigating rate schedules, upon complaint or upon its own initiative, and to prescribe substitutions for any it finds to be "unjust, unreasonable, unjustly discriminatory or unduly preferential." This power applies also to the pipelines' regulations, measurements, practices or services.

The rules and regulations of the Interstate Commerce Commission, as prescribed in the Interstate Commerce Act of 1920, are set up for the guidance of the proposed pipeline commission.

A section of the act states that it "shall operate only where state regulatory bodies were without jurisdiction."

Following introduction of the Capper bill, representatives of 11 state utility commissions met in St. Louis, Mo., early in January, at the call of the Kansas Public Service Commission. Represented at the meeting in St. Louis were the commissions of Georgia, Iowa, Indiana,

Substitute for Capper Measure Being Drafted by Utilities Associations

Kansas, Louisiana, Maryland, Minnesota, Missouri, North Dakota, Oklahoma, and Tennessee.

General opinion in the St. Louis meeting held that the Capper bill was deficient in several important respects, failing to protect the rights of the states. It was forthwith decided to frame a new law, to be sponsored by a committee appointed from among the commissions represented at the St. Louis meeting, in cooperation with the legislative and executive committees of the National Association of Railroad and Utilities Commissioners and that organization's general solicitor, John E. Benton of Washington, D. C.

Senator Capper, it is understood, will be requested to substitute the new bill for his measure.

Harvey H. Hannah, chairman of the Tennessee Railroad and Public Utilities Commission, and president of the National Association of Railroad and Utilities Commissioners, in a statement on pending national legislation in which states rights are an issue, had the following criticism to offer on the Capper bill:

"Senator Capper's act also contains a provision purporting to prevent the abrogation or restriction of the authority of state regulatory bodies, but in another section of the act the grant of jurisdiction to the federal commission is general, without attempt to distinguish as between interstate business and intrastate business, or between wholesale transactions between a producing company and a distributing company."

With gas transmission having achieved its national stature, it cannot hope to escape attempts at regulation on a national scale. The Capper measure, and the substitute bill which presumably is now under preparation under the direction of utility commission representatives, may very probably make little progress toward enactment in this session of Congress—but they are indicative of developing legislative interest in gas transmission, and the future course of legislative effort.

A pertinent statement relating to the natural gas industry's stand on federal regulation of pipelines was made before the National Association of Railroad and Utilities Commissioners by Alexander Forward, managing director of the American Gas Association, at the annual meeting of the organization held last November at Charleston, S. C. Extracts from Mr. Forward's remarks follow:

"A regulatory commission may feel that it is lacking in adequate power because it cannot regulate the price which the local distributing company must pay for the gas which has been transported to it from another State.

"It seems certain, however, that the commission may from accurate and authentic sources secure information which will enable it to determine whether the wholesale price of gas at the gate of the distributing city is over-reaching and clearly out of line with reason. The contract price paid at the gate by the local distributing company cannot be arbitrarily ignored by the commission in fixing the rates for local distribution, since for instance it may be the lowest gate rate the distributing company can secure from a reliable pipe line company possessing adequate supply and reserves, and the cost of such gas is an operating expense like other operating expenses, such as the cost of coal. If, however, it can be demonstrated that the amount paid for the natural gas transmitted in interstate commerce at the gate of the distributing city is unwarranted, manifestly unreasonable, or over-reaching it appears to me, from such study of the cases as I have been able to make, that the commission is not without power and authority in fixing the local rates to amply and fully protect the consumers of natural gas.

"As I view the situation, any burden which may be cast on the State commissions in respect to the charge of the wholesale transporting company for its delivered gas to the distributing company, is a minor matter so far as the public interest of the consumers is concerned, compared with the public disadvantages which must in my opinion result from the establishment by the Federal government of price control of this commodity on the ground that it is moving in interstate commerce. The business of producing gas is a different business from that of the railroad or telephone utilities. I think we may frankly admit that there is an element of chance in connection with the transportation of natural gas over long lines which must be taken into consideration in judging of that industry, and failure to recognize the elements of difference in this respect might well destroy the incentive to the producer of natural gas to continue exploration, development, and investment upon which the future usefulness of the natural gas industry in a great field must necessarily depend.

"May we not also take into view the practical effect of Federal commission regulation over this natural gas industry and price fixing thereof? . . . . If in general, when the State commissions, the local bodies, are fix-

(Continued on Page 56)

Pacific Coast Gas Association

Managing Director: Clifford Johnstone

Association Headquarters: 447 Sutter St., San Francisco

President: R. E. Fisher

Vice-President, Pacific Gas and Electric Co., San Francisco

Western Metal Congress, February 16-21

THE attention of those gas men interested in building the load through sales of gas to industry will center on San Francisco, when the Western Metal Congress and Metal and Machinery exposition opens on February 16. This is the second such event, the first being in Los Angeles two years ago.

The Industrial Sales Committee of the Commercial Section is taking an active part in the Congress, supplying material for a technical session devoted entirely to the use of gas in industry and sponsoring a comprehensive exhibit of gas-fired industrial equipment, occupying about 2400 square feet in the Civic Auditorium. The exhibit will be open from February 16 to 21 inclusive. The Pacific Coast Gas Association program will take place on February 19 at 10:00 a.m. in the St. Francis Hotel.

The program will be substantially as follows:

Gas Furnace for Nitriding—Jas. H. Knapp, James H. Knapp Co., Los Angeles.

Carburizing Steel by Gas—R. G. Guthrie, Peoples Gas Light and Coke Co., Chicago, Ill.

Progress and Development of Fuel Fired Furnaces—E. G. de Coriolis, Surface Combustion Co.

Manufacture & Properties of Seamless Steel Pipe—G. P. McNiff, National Tube Co.

CONFERENCE FEB. 18

Preparatory to this meeting, C. R. Miller, chairman of the Association's Industrial Sales Committee, has called a conference of all Coast industrial gas engineers and salesmen for 10:00 a. m. Wednesday, February 18 at the Palace Hotel. In connection with this conference there will be a noon luncheon addressed by President Fisher and C. B. Phillips, vice-president of the Surface Combustion Company.

Coast-wide Cooperative Advertising

THE Coast-wide Cooperative Advertising Campaign for 1931 receives the baton this month from 1930 and carries on the race for public favor. The first radio program of the new series goes on the air on Wednesday, February 11. The time is the same, 10:50 a. m. Last year the Radio Baby, Clayton Murdock Burns, endeared himself to thousands of Pacific Coast women. No less popular will be the Dixon family whose experiences in settling in an unnamed Pacific Coast city, and building a home, will be read by Helen Webster exactly as recorded in Mrs. Dixon's diary.

There will be a new booklet, called Easier Housekeeping, to offer to radio fans and the same booklet will be offered to readers of Sunset Magazine through a series of 12 advertisements. Both radio broadcasts and Sunset Magazine advertisements will feature domestic uses of gas—cooking, water heating, house heating and refrigeration.

Advertising to industrial and commercial users of fuel will continue. Ten distinct industries will be reached through 17 trade journals of Pacific Coast coverage. This advertising will be supplemented by continuous publicity through feature articles and news items. During 1930, 34 such articles boosting gas were published. They appeared in 13 different magazines and totaled more than 60 pages.

Full information concerning all features of the campaign will be supplied all members of the Association interested in sales through the medium of frequent news letters sent out by the committee. The committee is as follows: J. Charles Jordan, chairman, Pacific Gas and Electric Co.; F. H. Holden, Southern California Gas Co.; J. Earl Jones, Seattle Gas Co.; and E. P. Ramsay, Los Angeles Gas and Electric Corp. In an advisory capacity are: H. M. Crawford, Pacific Gas and Electric Co., chairman of the Commercial Section; W. D. Thurber, Southern Counties Gas Co., chairman of the Publicity and Advertising Section; and Clifford Johnstone, managing director, Pacific Coast Gas Association.

Architects Data Book on Gas Fuel Soon Ready

THE Architects and Contractors Manual, discussed so long by the Association's Commercial Section, is about to become a reality. All details regarding its contents, typography and style have been settled and an order given for its printing. It will be about 44 pages, letter size and bound looseleaf in an attractive file folder. Sample copies will be mailed to gas companies early in February.

The data in the Manual were assembled by a special committee headed by Frank Moon, of the Los Angeles Gas and Electric Corp. Great assistance was rendered the committee by Albert John Evers, A. I. A., a practicing San Francisco architect, who worked with the committee and made many suggestions which will add to the value of the Manual as a reference book for architects. Mr. Evers is secretary of the California State Board of Architectural Examiners, Northern District.

Accounting Section Plans February Conference

AN important conference of all Accounting Section members will be held in Los Angeles on February 24 and 25. The conference has been called by R. A. Hornby, chairman of the Accounting Section.

Women's Committee Award

THE Women's Committee, of which Clarita Scott of the Los Angeles Gas and Electric Corp. is chairman, has announced that P. M. Downing, vice-president and general manager of the Pacific Gas and Electric Co., San Francisco, has offered $50 in cash to the Women's Committee, to be awarded at the end of the Association year for the greatest contribution to the fund of ideas for Women's Committee work, programs, etc.

This prize will be divided between the committee chairman and the committee to which she belongs, $30 to the chairman and $20 to the committee.

There will be no differentiation between committees of different sizes. The actual work done, the subjects discussed, the educational, social and inspirational value of the activity of the committee will be the basis of the award.

Essay Contest Closed

THE time for entering essays in the Public Relations Annual Essay Contest closed on February 3 and the work of judging is now in progress. E. M. Seel and Miss Alma Freeburg, who are in charge of the contest, have no information as yet as to the total number of essays submitted, but the interest has been so great that a record number is assured. Many company's contest directors have staged heated interdepartmental contests offering special prizes or trophies to the department turning in the greatest number of essays in proportion to the number of employees. Each company director must now have essays judged and forward them to Miss Freeburg not later than March 1. Three per cent (or not less than 5) of each company's essays may be submitted in competition for the Coast-wide Association prizes and the balance sent in in a separate package for the prizes which are drawn by lot. The company directors are as follows:

Pierre Vinet, Coast Counties Gas & Electric Co.

D. L. Scott, Los Angeles Gas and Electric Corp.

O. B. Custer, Northwest Cities Gas Co.

Arthur L. Adkins, Pacific Gas and Electric Co.

Ray Edwards, San Diego Consolidated Gas & Electric Co.

Lloyd Henley, San Joaquin Light & Power Corp.

Capt. P. A. Brattain, Seattle Gas Co.

O. S. Clifford, Sierra Pacific Power Co.

R. R. Blackburn, Southern California Gas Co.

Walter Thurber, Southern Counties Gas Co.

B. H. Hoke, Spokane Gas & Fuel Co.

C. E. Lasher, Washington Gas & Electric Co.

Chas. Rucker, West Side Natural Gas Co.

A. Freeburg, Natural Gas Properties, Inc.

Coast Counties in Water Heater Sales Campaign

The New Business Department of Coast Counties Gas and Electric Co., Santa Cruz, Calif., is conducting an intensive water heater sales campaign, which opened January 12. The company expects to place 500 new water heaters on its system during the course of the campaign. Special terms have been arranged, and a thorough-going advertising program is being carried on in the newspapers, on billboards and on company trucks.

Technical Meeting at Los Angeles

AS advertised, the technical talent of the Pacific Coast Gas Association will concentrate at Los Angeles for a two-day session. The committee organizations have been on production for the past two months, which is an indication that this scheduled session will be a peak-hour affair.

On Thursday, March 5, the major committees and special committees will hold parallel sessions; these meetings being for the purpose of discussing committee activities and progress.

The general session is on the program for March 6, Friday, and will be held at the assembly hall of the Los Angeles Gas and Electric Corp. This meeting will present a program of general interest to all gas men, technical, operation or construction.

One of the features of the day will be an illustrated talk on pipe line construction, by W. R. Thompson, vice-president of the Southern Counties Gas Co. This presentation will be accompanied by a motion picture of the Southern California Gas Co.'s recent installation on the Ridge Route.

Other program events consist of contributions from major committees, on ground moisture survey, by O. L. Wrestler; reconditioned pipe, by R. C. Terradell. These mentioned subjects have secured a place on the program; others are under consideration.

The complete program will be released in the next issue of *Western Gas*.

P. G. and E. to Spend $11,000,000 on Gas Additions

The Pacific Gas and Electric Co.'s budget for gas construction for 1931 as tentatively approved, totals $11,000,000. Major items included in the amount call for construction of two large carriers, and additional lines to serve industrial districts of San Francisco.

The sum of $2,000,000 will be expended in constructing a second large-diameter line from Milpitas to San Francisco, tying in with the company's present line from Kettleman Hills to Milpitas Junction. Construction work in San Francisco's industrial district and on other improvement will cost approximately $1,000,000.

Another line will run from Sacramento to Marysville, and together with extensions, will account for another $2,000,000. The company's construction work in the Fresno district is expected to cost somewhat over a million dollars, one line serving Merced, and taking gas to the Herndon power plant of the San Joaquin Light & Power Corp., and another being constructed from the Kettleman Hills field to augment the supply in the Fresno system.

The company has been authorized by the California Railroad Commission to issue $25,000,000 in bonds, the money to be used for refunding bonds bearing interest at higher rates, and to finance additions and betterments for 1931.

Southern Counties to Serve Terminal Island

Southern Counties Gas Company of Los Angeles, Calif., has applied to the State Railroad Commission for a certificate of public convenience and necessity to exercise franchise rights granted by the City of Long Beach, to operate a pipe line from Mormon Island, across the Long Beach channel for the purpose of serving Terminal Island.

Santa Maria Gas Co. to Exercise Franchise Rights

Santa Maria Gas Co., Santa Maria, Calif., has been authorized to exercise franchise rights for the distribution of liquefied natural gas in Solvang, Santa Barbara County, and in Morro Bay, San Luis Obispo County.

Rates to be charged by the company in these districts provide for a service charge of $1.50 per meter per month, and commodity rates of 4 cents per pound for first 100 pounds, 3 cents per pound for next 400 pounds, and 2½ cents per pound for all over 500 pounds, per meter per month.

Pacific Gas Radiator Co. Buys Hammel Holdings

The Pacific Gas Radiator Co., Huntington Park, Calif., has purchased the holdings of the Hammel Radiator Corp., manufacturer of the Hammel gas steam radiator. Pacific Gas Radiator Co. is now manufacturing a line of gas steam radiators.

New Vancouver Office

Portland Gas and Coke Co., Portland, Ore., has opened new district offices at 1009 Main Street, Vancouver, Wash. The company reports that approximately 6 miles of distribution mains were laid in Vancouver during 1930, with 200 additional service connections.

Walla Walla Scheduled for "Natural" Service

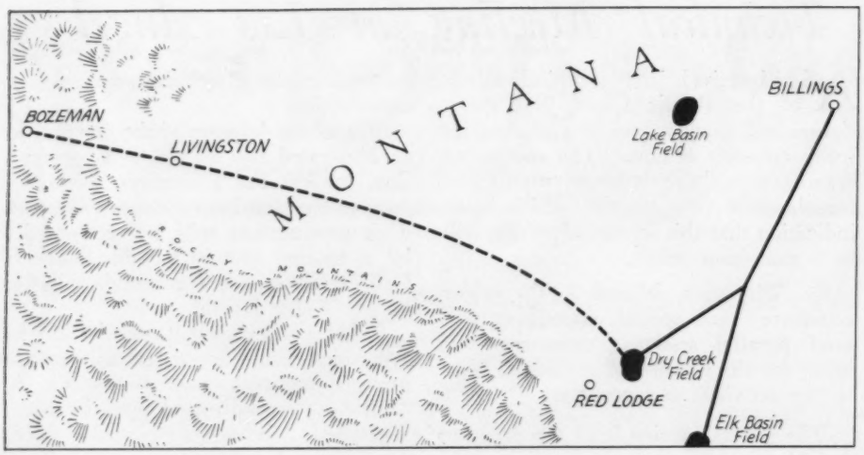
Walla Walla, Wash., recently granted Northwestern Natural Gas Co. a franchise for the service of natural gas, and the company is now planning an extension to that city. It is estimated that the line will cost approximately $858,000.

Las Vegas, Nev., to Have Butane Service

H. C. Keyes of Kingman, Ariz., has been granted a franchise for the service of liquefied petroleum gas at Las Vegas, Nev., and plans to put in a butane distributing plant immediately.

Line to Cottonwood, N. M.

Pecos Valley Gas Co., Roswell, N.M., plans construction of an extension from Lake Arthur to Cottonwood, N.M.



120-Mile Line to Bozeman Planned

THE above sketch shows the existing system of the Billings Gas Co., Billings, Mont., together with the tentative route (the heavy broken line) of the proposed natural gas transmission line from Dry Creek field to Bozeman, Mont. The 120-mile carrier as now planned will be of 8-inch pipe, and will pass through Big Timber, and Livingston. The company has been granted a franchise for the distribution of the gas in Bozeman, and has begun preliminary operations looking toward the construction of the pipe line.

$4,000,000 to be Spent by Los Angeles G. and E.

Nearly $4,000,000 will be expended by Los Angeles Gas and Electric Corp., Los Angeles, Calif., during 1931 for additions and betterments to its gas and electric systems, according to an announcement made by Addison B. Day, president and general manager of the company.

The bulk of this money will be used to provide additional distribution facilities. The balance will be spent for miscellaneous additions and betterments to the corporation's properties.

Among the chief items on the 1931 betterment program are 20 miles of commercial gas mains; 9,500 gas services; 10,000 gas meters and 4,000 gas regulators.

The most important item among the miscellaneous betterments is the $175,000 Inglewood district office building now under construction at the corner of Commercial and Manchester Streets, in Inglewood.

Officers of Lone Star Gasoline Corp. Are Named

The Lone Star Gasoline Corp., affiliated with the Lone Star Gas Corp., Dallas, Texas, following the purchase of properties in Texas of Chestnut & Smith Corp., Tulsa, Okla., has announced that the company has been incorporated under the laws of Delaware, with the following officers: L. B. Denning, president; R. A. Crawford, vice-president; F. L. Cline, vice-president and general manager; D. L. Cobb, secretary-treasurer; and J. R. Jarvis, general superintendent.

To Use Surplus Kettleman Hills Gas

The Dudley Ridge By-Products Co. plans to erect a plant in the San Joaquin Valley in California, for the utilization of Kettleman Hills natural gas. The plant will extract gasoline, manufacture dry ice, manufacture nitrates, and will use gas as a fuel for generating electric power to be sold wholesale to electric companies.

The first unit of the plant will have a capacity of 50,000,000 cubic feet per day, and another unit will be added later. The ice plant will have a capacity of 500 tons per day.

The company has been organized by the Dudley Brothers, operators in the territory for about 20 years. With them in the organization of the company are L. A. Phillipe, Wm. Kirkpatrick, A. H. Armstrong and others.

Mountain States O. & G. Enters Idaho Field

Mountain States Oil & Gas Co., Ogden, Utah, which has taken over the operations of the Crystal Dome Oil & Gas Co., reports that the company has brought in a second well estimated to be producing several million cubic feet of gas daily. The Crystal Dome well, brought in some months ago, is producing 5,000,000 cubic feet of gas daily.

Franchises for the distribution of natural gas are being asked by the company in Weiser and other neighboring cities.

Mid-West Industrial Gas Sales Council in Session

The Mid-West Industrial Gas Sales Council of the American Gas Association met January 16 in the Palmer House, Chicago, Ill. The following officers were elected to serve during the coming year: Chairman, G. H. Head, Wisconsin Gas & Electric Co., Racine, Wis.; vice-chairman, Wm. M. Riach, Jr., The Peoples Gas Light and Coke Co., Chicago; secretary and treasurer, J. J. Dignan, Public Service Co. of Northern Illinois, Chicago.

Members attending the annual meeting heard the following interesting program:

"Furnace Atmospheres," by J. A. Comstock, assistant metallurgist, The Peoples Gas Light and Coke Co., Chicago.

"Illuminating Gas Welding," by H. H. Lurie, research associate, Purdue University, Purdue, Ind.

"Advertising Industrial Gas," by J. F. Weedon, superintendent of advertising, The Peoples Gas Light and Coke Co., Chicago. This paper appears elsewhere in the current issue of *Western Gas.*

"Selling Industrial Gas," by Morse Dell-Plain, president, Indiana Public Service Co., Hammond, Ind.

"Nitriting Lead," by R. J. Cowan, metallurgist, Surface Combustion Co., Toledo, Ohio.

The papers of Messrs. Comstock, Lurie and Cowan were illustrated with slides.

Oklahoma Utilities in Annual Meeting March 10-11

OKLAHOMA Utilities Association has completed plans for holding its annual convention on March 10 and 11. The convention committee met early in January to outline a tentative program for the meeting. It was decided to eliminate the usual social activities, including the banquet, ball and reception, and to make it a "strictly business" convention.

The meetings will be held in two days instead of three. There will be a general session on the morning of the 10th, with division meetings in the afternoon and all day of the 11th.

W. A. Jones, chairman of the board of Henry L. Doherty and Co., and of Cities Service Co., and president of the National Electric Light Association, will be the principal visiting speaker. He will address the general session, and probably, informally both the gas and electric divisions. As more time is being devoted this year to the division meetings, special efforts are being made to bring the program for these meetings up to the highest standard.

On Wednesday night the Oklahoma finals in the national speaking contests will be held.

The ladies luncheon and Women's Committee program for the second day of the convention will be held this year as usual.

T. H. Steffens is president of the association, and E. F. McKay is manager, and both report, that while minus the usual "frills," the 1931 convention is expected to be the best in the history of the organization in practical value of its program to members.

Tuttle, Okla. to Vote Franchise

The town of Tuttle, Okla., has called an election for February 10, to vote on a franchise to the Western Service Corp., of Oklahoma City to install a natural gas distribution system in Tuttle. In the event the franchise is voted representatives of the company expect to be serving the city by September 1.

Central Western Gas in Franchising Activity

Central Western Gas Co., New York Oil subsidiary, has asked the Wyoming Public Service Commission for permission to supply several southeastern Wyoming towns with natural gas, among them Laramie, which is at present being supplied manufactured gas.

La Pryor, Texas, Has Natural

La Pryor, Texas, is now being served with natural gas through the mains of the Texas Gas Utilities Co., of Del Rio, Texas.

1931 Calendar

Fourth National Fuels Meeting, A.S.M.E.—Chicago, Ill., February 11-13, 1931.

Fifth Mid-West Regional Sales Conference, Commercial Section, American Gas Association—Sherman Hotel, Chicago, Ill., February 12-13, 1931.

Western Metal Congress and Exposition—To be participated in by the Commercial Section, P.C.G.A., San Francisco, February 16-21, 1931.

Pacific Coast Gas Association Accounting Section Conference—Los Angeles, Calif., February 24-25, 1931.

Southern California Meter Association—Los Angeles, Calif., February 26, 1931.

P.C.G.A. Technical Section Conference—Los Angeles, March 5-6, 1931.

Oklahoma Utilities Association—Annual Convention, Oklahoma City, March 10-11, 1931.

Second Annual Oil Equipment and Engineering Exposition—Los Angeles, March 16-22, 1931.

American Chemical Society, Gas and Fuel Division — Indianapolis, Ind., March 30-April 3, 1931.

Midwest Gas Association—Annual Convention, Dubuque, Iowa, April 13-15, 1931.

P.C.G.A., Joint Conference, Commercial and Publicity and Advertising Sections—Los Angeles, Calif., April, 1931, and Seattle, Wash., April, 1931.

American Gas Association Distribution Conference—St. Nicholas Plaza Hotel, Cincinnati, Ohio, April 8-10, 1931.

Annual Southwestern Gas Measurement Short Course—Norman, Okla., April 21-23, 1931.

Missouri Association of Public Utilities—Excelsior Springs, Mo., April 16-18, 1931.

Arizona Utilities Association (jointly with P.C.G.A. and P.C.E.A.)—Annual Convention, April, 1931.

American Gas Association Accounting Conference—Chicago, Ill., April 23-24, 1931.

Natural Gas Department, A.G.A.—Annual Convention, Memphis, Tenn., May 11-14, 1931.

P.C.G.A., Northern Regional Conference—Tacoma, Wash., June, 1931.

Pacific Coast Gas Association—Annual Convention, San Francisco, Calif., September, 1931.

Canadian Gas Association—24th Annual Convention, Windsor Hotel, Montreal, Quebec, Canada, June 4-5, 1931.

American Gas Association—13th Annual Convention, Atlantic City, week of October 12, 1931.

Memphis Convention Plans Forming

ARRANGEMENTS for the Annual Convention of the A.G.A. Natural Gas Department, to be held May 11-14 at Memphis, Tenn., are well under way, as a result of preliminary meetings held in January. Sessions will be at Hotel Peabody.

A meeting of the entertainment committee took place on January 5 at Memphis, to work out the social features of the convention, and the program committee met on January 8 to plan program details. The tentative arrangements have been circulated among the various committee members for comment and approval.

Program subjects as thus far outlined indicate that special emphasis will be put on the production and distribution phases of the industry at this year's annual convention, according to E. J. Stephany, secretary of the Department.

The following committees are in charge of arrangements for the meetings:

General Arrangements:

W. J. O'Brien, Chairman, Memphis Power and Light Company, Memphis, Tenn.

B. C. Adams, Gas Service Company, Kansas City, Mo.

J. B. Corrin, Standard Oil Company of New Jersey, Pittsburgh, Pa.

H. L. Dickerson, United Gas Corporation, Houston, Texas.

Edgar G. Hill, Arkansas Valley Natural Gas Company, Colorado Springs, Colo

Alfred Hurlburt, Central Public Service Corporation, Chicago, Ill.

J. R. Munce, Arkansas Natural Gas Corporation, Shreveport, La.

F. F. Schauer, Equitable Gas Company, Pittsburgh, Pa.

D. C. Shaffer, Memphis Natural Gas Company, Memphis, Tenn.

T. R. Weymouth, Columbia Gas and Electric Corporation, New York City.

William Moeller, Jr., Southern California Gas Company, Los Angeles, Calif.

Program Committee:

E. F. Schmidt, Chairman, Lone Star Gas Company, Dallas, Texas.

W. A. Dunkley, Memphis Power and Light Company, Memphis, Tenn.

L. Fitzpatrick, Western Public Service Company, Salt Lake City, Utah.

T. H. Kerr, Columbia Gas and Electric Corporation, Columbus, Ohio.

J. H. Maxon, North American Light and Power Company, Omaha, Neb.

A. E. Merchant, New Orleans Public Service Incorporated, New Orleans, La.

H. L. Montgomery, Cities Service Gas Company, Bartlesville, Okla.

W. B. Trammell, Houston Natural Gas Company, Houston, Texas.

George Wehrle, Public Service Company of Colorado, Denver, Colo.

W. S. Yard, Pacific Gas and Electric Company, San Francisco, Calif.

Publicity Committee:

Paul Renshaw, Chairman, Memphis Power and Light Company, Memphis, Tenn.

J. C. Barnes, New Orleans Public Service Incorporated, New Orleans, La.

William C. Grant, Lone Star Gas Company, Dallas, Texas.

C. D. Greason, Gas Service Company, Kansas City, Mo.

R. S. McBeth, Oklahoma Natural Gas Corporation, Tulsa, Okla.

Hotels Committee:

J. J. Brennan, Chairman, Memphis Power and Light Company, Memphis, Tenn.

Reception Committee:

W. N. Ford, Chairman, Memphis Power and Light Company, Memphis, Tenn.

H. C. Cooper, Hope Natural Gas Co., Pittsburgh, Pa., is chairman of the Natural Gas Department.

A number of the Department activities which are of general importance to the industry, and which will show progress between now and convention time, are the following:

Conservation

The Main Technical and Research Committee of the Natural Gas Department recently met in St. Louis, Mo., to discuss a program for work in connection with natural gas conservation. The work as outlined will deal largely with matters of production and will concern also transmission, distribution and utilization. Several additional subcommittees will be appointed to carry on the study of conservation of natural gas and the elimination of unnecessary waste.

Measurement

The Gas Measurement Committee has completed its Report No. 1, and is continuing its studies with particular emphasis on the effect of pulsations on gas measurement, with special attention being given to compressor stations.

Pipe Line Flow

The Pipe Line Flow Committee is working on a report to present to the Department in the near future, while the Committee on Gas Well Deliveries will continue the study of determination of gas well delivery capacities. The committee's work will probably be extended to include other production and field problems.

Home Study Course

A committee has recently been appointed to serve as an advisory committee on a natural gas home study course, sponsored by the Department. The committee consists of the following members: J. D. Creveling, Henry L. Doherty and Co., New York; F. L. Chase, Lone Star Gas Co., Dallas, Texas; A. B. Macbeth, Southern California Gas Co., Los Angeles, Calif.; and J. B. Garner, Hope Natural Gas Co., Pittsburgh, Pa. The course is being prepared under the direction of Prof. C. M. Young of the University of Kansas at Lawrence.

Texas Gas Utilities Extends Pipe Line System

Further extension of the Texas Gas Utilities Co., pipe line system in the rapidly-growing Winter Garden district of Texas has commenced with the work of laying another new lateral line, through which La Pryor will be served with natural gas, according to announcement by officials of the company, subsidiary of Appalachian Gas Corp. Work was simultaneously commenced on the construction of a distribution system for the supply of domestic, commercial and industrial consumers. The new line taps the company's main Uvalde-Crystal City-Carizzo Springs line at a point about 25 miles south of Uvalde.

Advertising Along the Gas Line in San Diego

THE above illustration shows how the San Diego Consolidated Gas and Elec- Co., San Diego, Calif., carries the message of gas to passers-by on the highway during the installation of new service mains. These signs, which have been newly adopted by the company, were constructed of sheet iron and set on iron tripods. The original order called for 36 such signs which were placed about 25 yards apart in groups of nine.

Natural Gas to Douglas Arizona, by June 1, 1931

Plans of the Western Gas Co., El Paso, Texas, for taking natural gas into Arizona mining centers are now shaping up, with promise of gas to the Phelps-Dodge smelters at Douglas by June 1.

The line route has been re-surveyed, and calls for a 12-inch line from the end of the Jal-El Paso line, to Deming, N. M., from thence to Rodeo, Arizona, and on south to Douglas.

The Western Gas Co., has filed articles of incorporation with the Arizona state corporation commission, with Phoenix designated as Arizona headquarters for the company. Incorporators are listed as C. S. Peabbles, L. E. Gray, and H. E. Grantland, all of Wilmington, Delaware. Paul Kayser, president of El Paso Natural Gas Co., is president and Russell W. Strong is assistant secretary. Corporation papers were filed by Ned Creighton, named as Arizona agent for the company. Original articles were filed in Delaware some months ago.

New contracts have been signed by Western Gas Co., with the Phelps Dodge Corp., which call for delivery of natural gas to the latter company's Copper Queen smelter at Douglas not later than June 1.

It is understood that Western Gas Co. has already placed an order for 11 760-h.p. compressors to be used on the Arizona line.

Operation of the line will be by the Western Gas Co., with an extension to Cananea, Mexico, in the name of a subsidiary, Compania Occidental de Gas, S. A.

Walters Resigns Post With Oklahoma Natural

Fay C. Walters, formerly superintendent of distribution for the Oklahoma Natural Gas Corp., Tulsa, Okla., has resigned in order to accept a position with the Panhandle Eastern Pipe Line Co. of Kansas City, Mo.

Mr. Walters had been connected with the Oklahoma Natural organization for 10 years. During this time he participated actively in affairs of the American Gas Association, Oklahoma Utilities Association and the Southwestern Gas Measurement Short Course. He was on the general committee and had charge of publications of the Short Course for 2 years.

Mr. Walters was graduated from the University of Kansas in 1918 and has been engaged in the gas and oil industry in the southwest since that time.

A. F. Deen has been appointed as the successor of Mr. Walters as superintendent of distribution. Mr. Deen has been in the gas industry in Oklahoma, Kansas and Missouri for a number of years and has been a member of the Oklahoma Natural organization for 12 years.

Renewing Plant in El Centro, California

As a part of its program for the further development of gas service in the Imperial Valley, Natural Gas Corp. of California has started work on the rehabilitation of the gas plant and distribution system at El Centro.

The system includes the properties of the Inland Empire Gas Company, which has been acquired recently by the Natural Gas Corp. of California, which has also recently completed construction of new air-butane plants and distribution systems in the neighboring cities of Brawley and Calexico.

General Superintendent E. M. Lindsey of the Natural Gas Corp of California is in active charge of this rehabilitation work, which will consist of the laying of some new mains and the replacing of others, together with new and modern equipment in the gas plant.

Electrogas Furnace Co. Opens New S.F. Office

The Electrogas Furnace Co., located for several years in the Rialto Bldg., San Francisco, has opened new offices at 466 Sutter St., with a display of floor furnaces and Welsbach heaters on the ground floor.

Electrogas has recently completed an arrangement with the Welsbach Co. through which they will act as distributors in northern California for "Hotzone" and "Stazhot" water heaters.

An East Bay branch office has recently been opened at 512 17th St., Oakland, with a similar display, under the management of A. A. Montagne.

With the introduction some months ago of three new models of Electrogas floor furnaces, sales for the last three months are approximately 20 per cent over the sales for the corresponding months in 1929. Under a policy of selling both wholesale and retail, this company is now employing six salesmen in the East Bay territory and two in San Francisco.

L. C. Smith Assistant to A. G. A. Managing Director

LOUIS C. SMITH, formerly vice-president and division manager of the New York Power and Light Corp., on January 1 joined the American Gas Association as assistant to the managing director. In announcing this appointment, Alexander Forward, managing director of the Association, said that Mr. Smith brought to his new work many years experience as a public utility operator.

Louis C. Smith

Entering the employ of the Philadelphia Gas Works, Philadelphia, Pa., Mr. Smith, shortly after his graduation from the Mechanical Engineering Department of the University of Pennsylvania, spent three years in distribution work in Philadelphia, becoming assistant superintendent.

Mr. Smith's early experience in gas production was obtained in experimental work at the Point Breeze plant.

During a long connection with the United Gas Improvement Co. he had charge of the inventory and appraisal of the distribution system of the Omaha Gas Co., and became engineer, then manager of the Fulton County Gas and Electric Co.

In 1925, when the Mohawk Hudson System was developed, Mr. Smith became president of the Fulton County Gas and Electric Co. in charge of all its operations.

In 1927 he was made a vice-president and division manager of the New York Power and Light Corp. and for the past several years has acted in that capacity, handling operations in the Mohawk and Schenectady divisions.

Southern Saskatchewan Gas Co., Ltd., is Formed

Incorporation of a new Canadian gas utility is reported, papers having been filed, according to recent dispatches from the press, by the Southern Saskatchewan Gas Co., Ltd. According to the report, the company plans construction of a natural gas transmission line from the Bowdoin field in Montana, to Regina and Moosejaw, Saskatchewan. The line would be 175 miles long, and if franchises are secured, would be financed by Nesbitt Thompson & Co., and by the Power Corp. of Canada.

Rutgers U. Issues Home Study Course on Gas

Rutgers University, of New Brunswick, New Jersey, is offering a home study course in the manufacture, distribution and utilization of gas, under the university extension division, N. C. Miller, director.

A detailed study of the important underlying laws of procedure has been written in non-technical language, understandable to the layman without knowledge of chemistry or physics.

The course has the approval of the A.G.A. through an advisory committee. It covers such subjects as chemical compounds and mechanical mixtures, raw materials, combustion, steam and steam boilers, essential principles in the manufacture of coal gas, producer gas, coal gas generating equipment, large and small capacity coal carbonizing equipment, apparatus used in analysis and manufacture of blue and carbureted blue gas, fuels, gas handling, gas holders, gas distribution, the customer's meter, and the utilization of gas.

Cost of the course is $18, and a certificate will be awarded to all students who successfully complete the work. Enrollments will be accepted at any time. Information will be supplied either by the university or by the American Gas Association, 420 Lexington Ave., New York.

Clarke Now Vice-President of Columbia Gas and Electric

E. A. CLARK, until March, 1930, with Oklahoma Natural Gas Corp. as general superintendent of distribution, has been appointed vice-president of the Pittsburgh group of Columbia Gas and Electric Corp. at Pittsburgh, Pa. Following his resignation from the staff of Oklahoma Natural, Mr. Clark accepted an executive post with the Charleston group of the Columbia Gas and Electric Corp.

E. A. Clark

Mr. Clark was with Oklahoma Natural from 1917, becoming an employee of the gas measurement department of the organization at that time. When the company was reorganized in 1927, he was placed in charge of gas distribution for the system, then embracing about 55 towns and cities in Kansas, Oklahoma, and Texas.

While in the middle west, Mr. Clark participated actively in the affairs of the Natural Gas Department of the American Gas Association, and served on the executive committee of the Oklahoma Gas Meter Short Course, held annually at Norman, Okla.

Properties of the Columbia Gas and Electric Corp. extend through New York, Pennsylvania, Ohio, West Virginia, Virginia, Kentucky and Maryland, and include both gas and electric plants and distribution systems.

$850,000 for Additions in San Antonio, Tex., in 1931

San Antonio Public Service Co., San Antonio, Texas, plans to spend approximately $850,000 during the year 1931 for additions to its system.

$250,000 for 1931 Advertising Quota

PLANS have been completed for the 1931 advertising campaign of the Pacific Gas and Electric Co., San Francisco, Calif., which is to be the biggest in scope yet undertaken by this company. Well over a quarter of a million dollars will be spent and over half of this amount will be in advertising its gas service and merchandise.

Territory served by the Pacific Gas and Electric Co. embraces a total population of approximately 3,000,000, one-third of whom are customers of the company. Gas consumers total slightly less than half a million.

The major portion of the funds will be spent in newspaper advertising designed to blanket the territory served and to tie in with the seasonal campaigns outlined in the sales program.

Two hundred and eighty newspapers will be used on a regular schedule of once a week insertions in the dailies and every other week insertions in the weeklies. One hundred separate pieces of copy with the necessary art work are in production.

The 1931 advertising policy will exclude the use of special editions, annual newspapers and other class publications.

A poster board campaign is also included among the major activities of the company's publicity department. There will be half showings every other month in the 88 principal cities and towns throughout the system. Designs will be changed for every showing and will be carried on a total of 303 boards at one time.

Direct by mail copy is also in preparation for which 25 separate pieces of literature will be required. As in the case of newspaper advertising, the direct mailings will tie in closely with all seasonal campaigns. These campaigns include, as far as the gas division of the utility is concerned, a special campaign in March on conversion burners, in July on gas water heating and in September, October and November on gas house heating.

In 60 division and district offices of the company uniform window displays will be erected, also designed to be thoroughly in keeping with the other advertising appearing at the moment.

In addition to its purely local efforts, the Pacific Gas and Electric Co., is also supporting the cooperative advertising campaign of the Pacific Coast Gas Association. The Association's activities are viewed as supplementary and giving certain coverage that the company itself will not be required to duplicate. This includes, of course, the weekly radio broadcast, the advertising in "Sunset" magazine, and the advertising and industrial publicity program which is being carried in the trade press.

All of the company's advertising is divided into three major classes of appeal, first, institutional, second, new business, and third, merchandise. The new business budget represents the major portion and is strongly identified with the policy of increasing dealer cooperation which marks the Pacific Gas and Electric Co.'s 1931 program.

United Gas Public Service Co. Is New Operating Subsidiary

United Gas Corp., with headquarters at Houston, Texas, announces the organization of the United Gas Public Service Co., to act as its principal operating subsidiary. The company was incorporated under the laws of Delaware on January 20, and was formed for the purpose of simplifying the operations of subsidiaries of the parent company.

The new company will own and operate an extensive natural gas system covering portions of Texas, Louisiana, Mississippi, Alabama and Florida, including natural gas wells, producing acreage, pipe line and distributing systems.

These properties include in addition, the gas production properties in Louisiana, and the new pipe line extending from a point north of Jackson, Miss., to Mobile, Ala., Bogalusa, La., Gulfport, Miss., and Pensacola, Fla., formerly owned by Southern Natural Gas Corp., of Birmingham, Ala.

The United Gas Public Service Co., succeeds the United Pipe Line Corp.

Memphis Natural Gas Co. Planning Major Extensions

Memphis Natural Gas Co., Memphis, Tenn., is planning several extensions from its Monroe-Memphis carrier. A 10-inch lateral is proposed to leave the main line at a point near Helena, Ark., serving Mariana and Helena. From Mariana an 8-inch line will serve Forrest City and a 6-inch carrier will extend from Forrest City to Wynne. A second 8-inch extension from Mariana will take gas to Brinkley, and from there a 6-inch line will serve Augusta.

From Memphis, a 12-inch line will extend north serving Covington and Ripley. A 6-inch extension northward from Covington will reach Dyersburg. A 8-inch line will extend from a point midway between Covington and Dyersburg to Jackson, serving Humboldt through an extension. This west Tennessee project will cost approximately $1,600,000.

An 8-inch extension is also proposed to serve Blytheville and Osceola, Ark., and Caruthersville, Mo.

Drumheller Interests Actively Planning Line

Under plans outlined by Jerome K. Drumheller, a natural gas line to be constructed by interests which he represents, will extend from the Cut Bank field in northern Montana to cities of the Pacific Northwest, and will serve towns and cities of Montana and Idaho enroute. From Montana the line will enter Idaho east of Burke and travel generally westward through that state to Spokane, Wash., serving many communities. It is planned that the line will pass along the state highway through Wallace, Kellogg, Coeur d'Alene, and Post Falls. Mullan and Wardner in the same district will be served by laterals. From Coeur d'Alene, the line will parallel the state highway to Spokane. It is reported that the line this far will cost approximately $15,000,000 traversing some of the most mountainous terrain of the Pacific Northwest.

Mr. Drumheller has applied to the state utility commissions of Washington and Idaho for certificates of convenience and necessity for constructing the line across those states, according to recent reports from the press.

Otis, Colo., Grants Franchise

Eastern Colorado Gas Co., has been granted a franchise for the service of natural gas in Otis, Colo.

MEASUREMENT and CONTROL

Determining Water Vapor Content *of* Gas

Its Application to Natural Gas Measurement

By Wm. L. Cowan

Union Oil Company of California

WATER in a vaporous state exists in nearly all natural gas to some extent. Gas and oil in migrating to underground structural reservoirs usually come into contact with water during migration and in almost every instance water is present in the lower portions of all productive sands. It might be assumed, therefore that formation gas down in a structure nearly always contains its maximum allowable percentage of water vapor corresponding to existing structural temperature and pressure conditions.

Wm. L. Cowan

The relative amount of water in a gaseous form which *can* exist in a mixture of water vapor and some other gas, is entirely dependent upon the temperature and pressure of the mixture. This mixture is usually called the "gas." For any *given "gas" pressure,* then, more water vapor can exist when the "gas" is hot than when it is cold. At a constant "gas" temperature more water vapor can exist when the total "gas" pressure is low than when it is high.

It can be assumed, then, that when the gas from the formation is allowed to reach the surface, its capacity for holding water in the vaporized state may be either increased or decreased depending upon the relative temperature and pressure conditions existing in the formation and at the surface. In the case of oil wells it can generally be roughly assumed that the gas in the gas-oil separator is saturated with water vapor regardless of formation conditions, for in most instances the oil will show at least a small amount of "free" liquefied water which indicates an excess of water present over that needed for complete water vapor saturation. There is usually, but not always, sufficient heat, time, surface, and agitation within a separator to cause the water to vaporize until it has exerted its full saturation pressure corresponding to the temperature of the rest of the gas.

This water vapor in the gas from the separator quickly becomes a source of trouble in handling, measuring and accounting for the gas as a whole. A few of the principal difficulties caused by water vapor in a gas as well as entrained liquid water or mist carried along in the gas are as follows:

(1) Water condenses out and causes a shrinkage in gas volume.

(2) Condensed water must be taken out of the line, necessitating the use of drips, scrubbers, etc., which are, of course, also used to collect any condensed hydrocarbons.

(3) Condensed water that is not collected in drips, etc., is carried along by the gas in the form of mist. In some instances this mist may revaporize and cause an increase in "gas" volume.

(4) Condensed water vapor causes additional absorption plant and compressor plant shrinkages as well as gathering line and transmission line shrinkages. However, conditions are such that instead of causing a shrinkage in gas volume, gains in water vapor volumes are often encountered when an unsaturated gas comes in contact with water in a liquid state.

(5) Due to its volume, water vapor partially cuts down compressor, pipe line and absorption plant capacities.

(6) Water vapor in a gas often causes valves, regulators, orifices, etc., to freeze over, at times doing a great deal of harm if not properly allowed for.

(7) Water vapor makes it very difficult to obtain a true gravity of the mixed gas flowing through an orifice in case of rich gases under high vacuums, which in turn brings an element of doubt into the gas volumes computed by this type of meter.

(8) Water vapor in a fuel gas reduces its overall B.t.u. heat value slightly.

(9) Condensed water often collects in low portions of gas lines, cutting down line capacity, which in turn causes the gas to flow through the line in surges. Water also often collects along either the upstream or downstream edges of orifices, washing back and forth and causing an unstreamline gas flow through the orifice, which in turn makes the chart hard to read as well as making the standardized coefficients for gas flow void.

(10) Water in gas often finds its way up into gauges and gauge lead lines where it causes incorrect differential pressures to be recorded, which in turn result in incorrect calculated volumes. This water is probably formed by condensation of the gas at these particular points.

(11) Condensate present in lines leading to compressors, presents an operating hazard, i.e. the possibility of knocking out a head, etc.

As regards water vapor in the handling of natural gas, the greatest considerations that must be given to it are: (1) Provision of ample sized drips, etc., to catch all the condensed water at the most vital points. (2) Its effects upon overall "gas" shrinkages during the various stages of treating, compressing, and distributing the gas. In balancing out the distribution of gas from wells to the final distributing points, all shrinkages (also gains) must be accounted for as nearly as it is possible to do so. Water vapor shrinkage often being an item of considerable importance, it should always be considered, and the maximum changes in "gas" volume due to it should be checked over. In this way a clearer understanding of why apparent excessive shrinkages sometimes occur that are greater than can be reasonably charged out against condensed hydrocarbons knocked out, can thus often be explained.

In the case of the gas from an oil well, it is ordinarily metered at approximately trap pressure and temperature. It is then piped to compressors where it is boosted in pressure and then run through a gasoline absorption plant or else it is delivered to the gasoline plant under its own well or trap pressure. The gas in passing through the extraction plant always shrinks in volume due to the liquefaction of many of the hydrocarbons. Gas temperatures sometimes drop during this process, which often causes some of the water vapor to condense out, which might cause an appreciable additional "gas" shrinkage through the absorber. Another factor of importance is that even though the actual percentage of water vapor in the "gas" to and from the gasoline extraction plant remained the same, temporarily considering no change of temperature or pressure, although in reality there always is an appreciable change, there would still be some condensation of water vapor as the total amount of gas was decreased. There is always a decided pressure drop between the intake and discharge of the plant, but the two other above factors are sometimes more than sufficient to compensate for this tendency towards increased water vapor capacity of the lower pressure. Due to heat at absorption, or possibly other causes, the temperature of the gas from the absorbers is often greater than that of gas to absorbers. In such instances

4th Hi-Jinks Is Much Enjoyed Affair

WITH a capacity turn-out of more than 200 members and visitors, the Southern California Meter Association on the night of January 24 staged its Fourth Annual Hi-Jinks. The Rancho Golf Club, Los Angeles, was secured for the banquet and entertainment program, the banquet being served at 7 p.m. An excellent program of dance and musical numbers followed. The entertainment committee, headed by T. G. McAlister, was in charge of the evening, which was much enjoyed by all present.

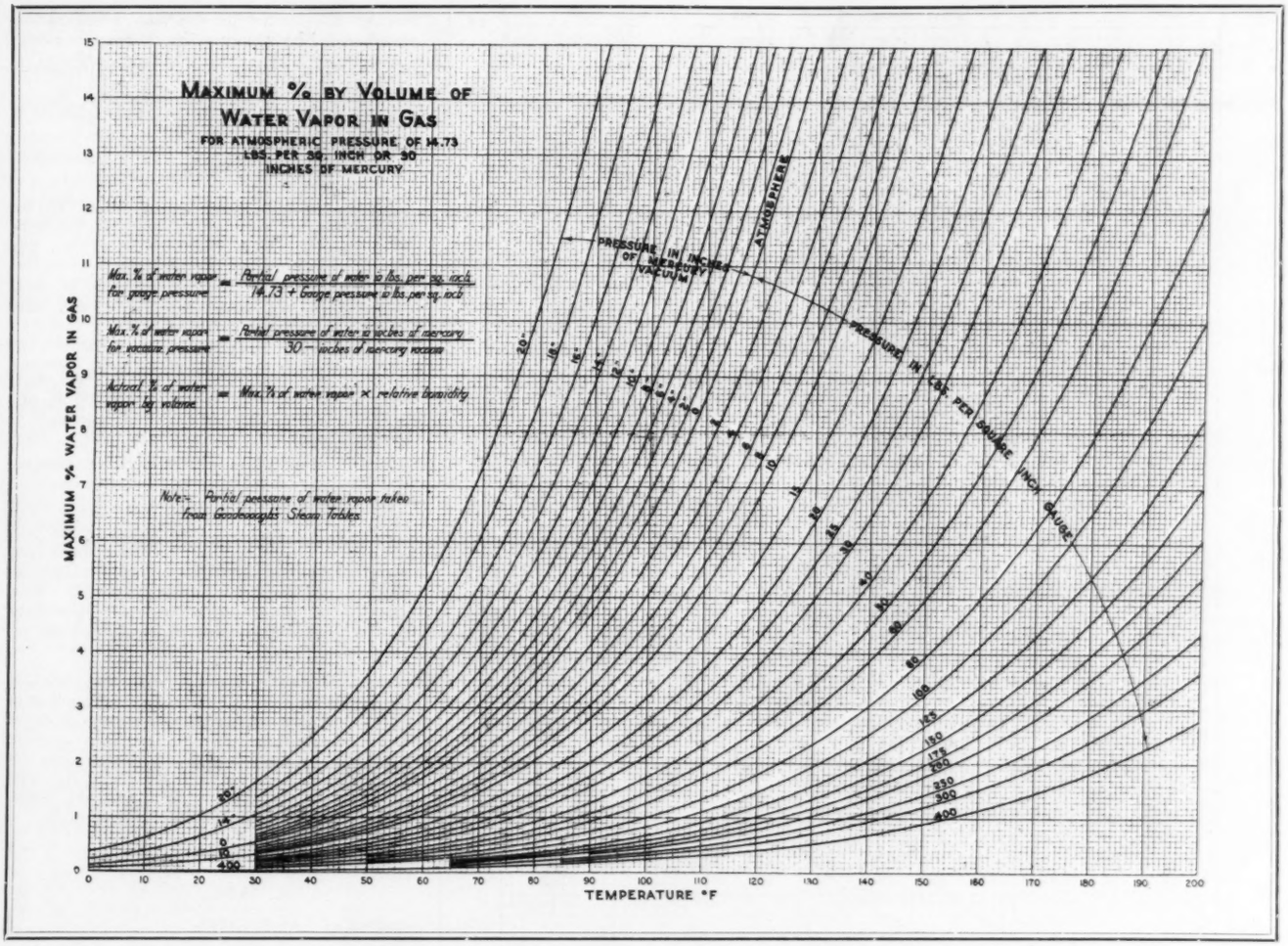

MAXIMUM % BY VOLUME OF
WATER VAPOR IN GAS
FOR ATMOSPHERIC PRESSURE OF 14.73
LBS. PER SQ. INCH OR 30
INCHES OF MERCURY
Max. % of water vapor for gauge pressure = Partial pressure of water in lbs. per sq. inch / 14.73 + Gauge pressure in lbs. per sq. inch
Max. % of water vapor for vacuum pressure = Partial pressure of water in inches of mercury / 30 − inches of mercury vacuum
Actual % of water vapor by volume = Max. % of water vapor × relative humidity
Note:- Partial pressure of water vapor taken from Goodenough's Steam Tables
MAXIMUM % WATER VAPOR IN GAS
TEMPERATURE °F
ATMOSPHERE
PRESSURE IN INCHES OF MERCURY VACUUM
PRESSURE IN LBS. PER SQUARE INCH GAUGE

Fig. 1

water carried along with the absorption oil is often vaporized enough to cause an actual gain in water vapor over that present in intake gas.

The gas from the discharge of the plant is then either distributed out as fuel at practically plant discharge conditions or it is delivered to compressors, which give it another boost in pressure for other distributions.

At nearly every point in handling the "gas" a different pressure or temperature condition exists. Whenever one of these conditions is changed the percentage of water vapor that the gas is capable of holding is also changed.

If a gas is only partially saturated with water vapor at a given temperature and pressure, and the temperature and pressure of the gas is changed so that the "gas" does not have as large a total capacity for holding water vapor as it did in the first condition, the *actual percentage* of water vapor compared to total "gas" will not change until the pressure is still further increased or the temperature further decreased to the point where water vapor in the gas begins to condense out.

Water Vapor Mixed With Other Gases

When two or more gases are thoroughly mixed together and equilibrium has been attained, each gas acts entirely as though the other or others were not present. Each gas completely fills the enclosing vessel by diffusion even though one gas is much heavier than the other. Thus it is seen that the same volume is occupied by each gas. Each gas, then, exerts a certain individual partial pressure upon the walls of this vessel and the total pressure exerted will be the sum of these individual or so-called partial pressures of each gas present.

To more thoroughly understand why volumes of individual gases in a mixed gas are proportional to the partial pressures exerted by them the following explanation might be given.

Suppose that the temperature of the gas in a line is 134°F. and the line pressure is 30 lbs. per sq. in. *abs.*, and it has been determined by test that the gas is completely saturated with water vapor at this condition.

From a steam table the pressure of saturation for water at 134°F. is 2.470 lbs. per sq. in. abs. The pressure caused by the other gaseous constituents must then be 30 minus 2.470 or 27.530 lbs. per sq. in. abs. For this one illustration let us *assume* a new standard cubic foot of gas equal to a cubic foot of gas at 134°F. and 1 lb. per sq. in. abs. Now consider a cubic foot of the mixed gas at 134° and 30 lbs. per sq. in. The number of standard cubic feet of water vapor in this 1 cubic foot of mixed gas sample would then be proportional to the ratio of the partial or saturation pressure of the water to the standard pressure of 1.00 or

$$\frac{2.470}{1.00} = 2.470 \text{ Std. cu. ft.}$$

as temperature of sample and of standard was the same. By the same deduction the number of standard cubic feet of the other gas present would be

$$\frac{27.53}{1.000} = 27.53 \text{ std. cu. ft.}$$

making the total standard cubic feet present in the sample equal to 30.00.

The percentage of the gas that is water vapor at line conditions is then equal to

$$\text{Per cent water vapor in total mixed gas by volume} = 100 \times \frac{\text{Abs. Saturation Press. of water}}{\text{Abs. Line Pressure}} =$$

$$100 \times \frac{2.470}{30.00} = 8.23\%$$

Similarly, the per cent mixed gas that is other gas =

$$100 \times \frac{\text{Abs. Partial Press. of Other Gas}}{\text{Abs. Line Pressure}} =$$

$$100 \times \frac{27.53}{30.00} = 91.77\%$$

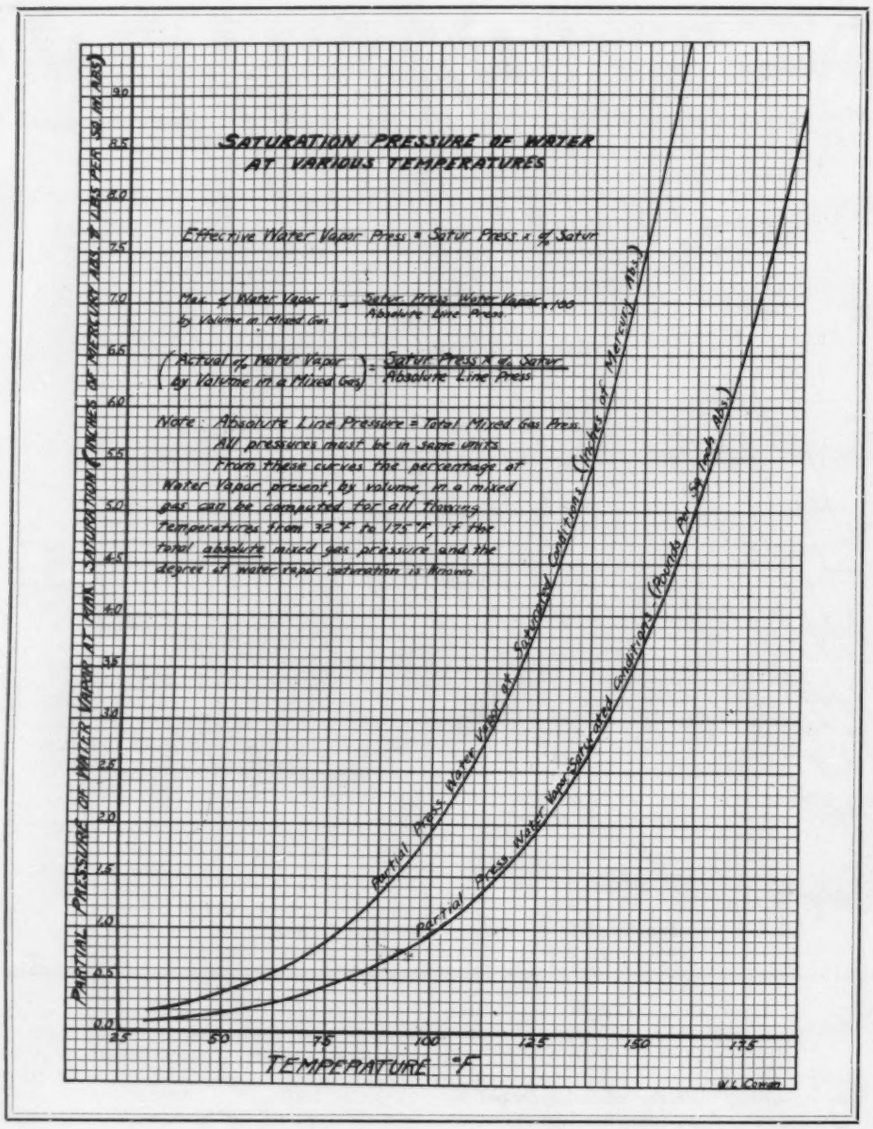

SATURATION PRESSURE OF WATER AT VARIOUS TEMPERATURES
Effective Water Vapor Press. = Satur. Press. of Satur.
Max. % of Water Vapor by Volume in Mixed Gas = Satur. Press. Water Vapor / Absolute Line Press. x 100
(Actual % of Water Vapor by Volume in a Mixed Gas) = Satur. Press. x % Satur. / Absolute Line Press.
Note: Absolute Line Pressure = Total Mixed Gas Press.
All pressures must be in same units.
From these curves the percentage of Water Vapor present by volume in a mixed gas can be computed for all flowing temperatures from 32°F to 175°F, if the total absolute mixed gas pressure and the degree of water vapor saturation is known.
PARTIAL PRESSURE OF WATER VAPOR AT 100% SATURATION (INCHES OF MERCURY ABS. & LBS. PER SQ. IN. ABS.)
Partial Press. Water Vapor at Saturated Conditions (Inches of Mercury Abs.)
Partial Press. Water Vapor at Saturated Conditions (Pounds per Sq. Inch Abs.)
TEMPERATURE °F
W. L. Cowan

Fig. 2

In other words, had the water vapor been taken out of the 1 cubic foot sample the pressure of the sample would have decreased to 27.53 lbs. per sq. in. abs.

From the chart shown in Fig. 1 this percentage of water vapor that can exist in a gas of 134°F. temperature and a gauge pressure of 30 — 14.73 = 15.27 lbs. per sq. in. gauge can be read off directly = 8.23 (that is if atmospheric pressure is 14.73 lbs. per sq. in.).

If a test of the water vapor saturation of the gas in the line had shown only 60 per cent saturation, then the actual partial pressure of the water vapor would have only been 60 per cent × (partial pressure at complete saturation conditions) or .60 × 2.470 or 1.4820 lbs. per sq. inch. If the line temperature and pressure was still 134°F. and 30 lbs. per sq. in. abs. the percentage of water vapor present would have only been

$$\frac{1.482}{30} \times 100 = 4.94\%$$

This can also be easily determined from the same chart by merely looking up the per cent water vapor for complete saturation and multiplying by 60 per cent, or 8.23 × .6 = 4.94 per cent.

Method of Making Chart

The method of plotting the chart in Fig. 1 is relatively simple. First an *atmospheric pressure of 14.73 lbs.* per sq. inch and conditions of complete water vapor saturation were *assumed*. Separate calculations for each gauge pressure or vacuum line shown were then made. An illustration of the 10 lbs. per sq. in. gauge curve being shown is as follows:

Absolute line pressure would be 14.73 + 10.00 = 24.73 lbs. per sq. in.

By looking up in Goodenough's Steam Table for 35°F., 50°F. and 100°F., etc., the saturation pressure for water was found directly, being equal to

35°F. saturation pressure = 0.1000 lbs. per sq. in. or 0.2036 inches Mercury.

50°F. saturation pressure = 0.1780 lbs. per sq. in. or 0.3624 inches Mercury.

100°F. saturation pressure = 0.949 lbs. per sq. in. or 1.931 inches Mercury.

The maximum percentages of water vapor for 10 lbs. per sq. in. gauge (14.73 lbs. per sq. in. abs.) was then determined merely by finding the ratios of the above saturation pressure to the absolute line pressure or for:

35°F. max. amount water vapor present = (0.1000 ÷ 24.73) × 100 = 0.404 per cent.

50°F. max. amount water vapor present = (0.1780 ÷ 24.73) × 100 = 0.720 per cent.

100°F. max. amount water vapor present = (0.949 ÷ 24.73) × 100 = 3.84 per cent.

In the case of vacuum pressures 30 in. vacuum corresponds to absolute zero pressure when atmospheric pressure is 14.73 lbs. per sq. in., or in other words 14.73 lbs. per sq. in. = 30 in. Hg. abs. pressure and 10 in. Hg. vac. = 20 in. Hg. absolute pressure, etc. The plotting of the curve for 10 in. Hg. vac. can thus be simply computed as follows:

For 35°F. max. amount water vapor possible = 100 × (.2036 ÷ 20) = 1.018 per cent.

50°F. max. amount water vapor possible = 100 × (.3624 ÷ 20) = 1.812 per cent.

100°F. max. amount water vapor possible = 100 × (1.931 ÷ 20) = 9.655 per cent.

For any atmospheric pressure *other than 14.73 lbs. per sq. in. or 30 in. Hg.* these percentages shown on the curve are incorrect, the error increasing as the actual atmospheric pressure deviates further from 14.73. New curves for different atmospheric pressures can be plotted as shown in the following example:

Atmospheric pressure = 14.20 lbs. per sq. in. or 28.92 in. Hg. For a gauge pressure of 10 lbs. per sq. in and a temperature of 100°F the percentage water vapor present is (0.949 ÷ 24.20) × 100 = 3.92 per cent instead of 3.84 per cent, and for 10 in. Hg. vac. or 28.92 — 10 = 18.92 in. Hg. abs. the maximum percentage water vapor present is

$$100 \times \frac{1.931}{18.92} = 10.21\%$$

instead of 9.66 per cent.

Where atmospheric pressures are different from 14.73 lbs per sq. in., close approximations are possible from the above curve merely by *converting the apparent gauge pressure to true absolute pressures.*

For instance, if atmospheric pressure is 28 in. Hg. and the vacuum line pressure is 10 in. Hg. vac., merely use the 12 in. Hg. vac. curve for the temperature under consideration instead of the regular 10 in. vac. curve. A pound or two difference in gauge pressures over 30 lbs. per sq. in. causes very little change in maximum per cent of water vapor present.

The curve shown in Fig. 2 is perhaps of greater value than that of Fig. 1, for from it the percentage of water vapor present can be quickly determined if the absolute line pressure and percentage of water vapor saturation are known.

Methods Used to Determine Relative Water Vapor Saturation

The effective pressure of water vapor is directly proportional to the percentage of water vaporized compared to the maximum which could be vaporized, at the temperature and pressure conditions under consideration. The less this effective pressure, the smaller quantity of water vapor to total gas present. This percentage of complete saturation is called the relative humidity. It can be obtained by placing a wet and dry bulb thermometer inside the moving flow of gas at line conditions. The "wet" bulb is one which is wetted with water. The difference between temperatures recorded by these two thermometers will indicate a certain percentage of humidity that can be found from

charts or tables. The cooler the wet bulb temperature compared to that of the dry bulb, the lesser is the degree of saturation. When both thermometers read the same they indicate that the gas is saturated with water vapor, as there is no further tendency for the water on the wet bulb to evaporate and cause a cooling action.

This method is simple and relatively accurate enough for most purposes. As the greatest effect of water vapor is in lines at vacuum or low gauge pressures, little trouble is found in inserting the thermometers into the line. At higher pressures, however, this method is not so successful without special equipment.

Other methods of determining percentage of saturation are those which use a substance such as calcium chloride, phosphorous pentoxide, etc., that have the ability to absorb a great deal of water. By running a measured quantity of gas through a known weight of one of the above substances and then reweighing the substance to find out how much water was absorbed, the amount of water in the vapor state at line conditions can be computed.

For example, suppose 0.1 lb. water was picked up in a calcium chloride tube from 1500 cubic feet at line conditions of gas at temperature of 100°F. and line pressure of 2 lbs. per sq. in. gauge (atmospheric pressure 14.73 lbs. per sq. in.) or 16.73 lbs. per sq. in. abs. Water vapor at saturation conditions and 100°F. would exert a partial pressure of 0.949 lbs. per sq. in. abs. and the weight of this water vapor would be .002855 lbs. per cu. ft. As maximum volumetric percentage of water to the total gas present is proportional to partial pressures, 1500 cu. ft. of gas at line conditions would contain at maximum saturation

$$1500 \times \frac{0.949}{16.73} = 85.1 \text{ cu. ft.}$$

Weight of this water vapor would be $85.1 \times .002855 = 0.243$ lbs. As only 0.1 lb. of water was actually recovered, the relative saturation would be the ratio of $0.1 \div 0.244 = 0.41$ or 41 per cent.

The importance of water vapor shrinkage compared to hydrocarbon vapor shrinkages might be more fully appreciated when it is realized that for most ordinary purposes the liquefaction of 1 gallon of water represents a reduction of approximately 175 std. cu. ft of water vapor, while the liquefaction of 1 gallon of low pressure compressor distillate represents perhaps 19 std. cu. ft. of vapor, 1 gallon of unstable absorption gasoline perhaps 26 std. cu. ft. per gallon, and still lighter fractions perhaps 35 std. cu. ft. per gallon.

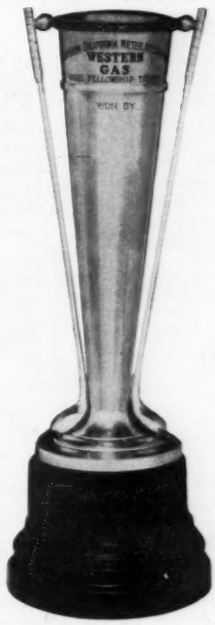
American Meter Co. Offers Two Orifice Prover Outfits

For the purpose of accurately proving displacement meters in place by a company's own maintenance men instead of shipping them to the makers or to a meter shop, American Meter Co., through Metric Metal Works at Erie, Pa., has brought out assemblies of testing equipment known as the Pierce critical flow orifice prover, and the Metric low-pressure flow prover. The testing methods involved are based on scientific laws. They are fully described on pages 121-138 of this company's new handbook covering all phases of displacement meters. Each complete outfit includes a prover nipple, a set of orifices, a thermometer, stop watch, and other accessories in a carrying case.

S. C. M. A. Winds Up Series of Golf Tournaments

CONCLUDING a series of tournaments which has been under way for more than a year, the Southern California Meter Association on January 18 held a "jubilee golf tournament" at the Hacienda Country Club, near La Habra, Calif. The immediate purpose of the tourney was a play-off among the 12 winners of monthly tournaments, for the permanent possession of the S.C.M.A. *Western Gas* Good Fellowship Trophy. This trophy now is the property of H. G. Andrews, of the Southern California Gas Co., who brought in a net score of 74 to win low net.

The Association's entertainment committee, of which T. G. McAlister is chairman, was in charge of the tournament, with A. E. DeBurn handling the arrangements. In addition to the cup contenders, there were several foursomes made up of Association members, and a wide assortment of special prizes had been donated for competition.



S.C.M.A.-Western Gas Good Fellowship Trophy.

Awards for the various special events went to the following:

Low gross: Prize, a golf shoe bag, to S. Fluor, Sr.

Low net: Prize, a golf belt, to C. A. Wheeler.

Flag contest: Prize split between E. Lorenz and C. A. Wheeler.

Low gross on short holes: Prize, a putter, to A. F. Midas.

Low gross on odd holes of first nine: Prize, golf balls, to G. H. Finley.

Low gross on even holes of second nine: Prize, golf balls, to J. X. Smith.

Pitch-to-pin contest: Prize, a jigger, to F. S. Burt.

Driving contest: Prize, a driver, to H. G. Andrews.

A questionnaire is now being circulated to determine what form S.C.M.A. golf shall take during the present year, and members are urged to return it to the committee promptly.

North Central Gas Co. Is Surveying Line Route

North Central Gas Co., Casper, Wyo., has begun a survey for the proposed transmission line which will take Wyoming's natural gas into Nebraska centers. Three crews are making a preliminary survey of the line as far east as Alliance, Neb., and as far south as Laramie, Wyo.

The line as proposed will start from the Muskrat field, 75 miles west of Casper, and will serve a score or more of towns in Wyoming and Nebraska on its route to Alliance, present terminus. The line will also serve about 10 beet sugar factories. The system, with its laterals, will consist of more than 400 miles of 12-, 10- and 8-inch pipe, and will serve a market demanding about 6,000,000,000 cubic feet of gas per year.

Franchise activities are going on apace, with applications filed in several of the Nebraska towns, among them Scottsbluff, where an election will be held on February 10.

Industrial Conversion Job

The Public Service Co. of Colorado, Denver, recently completed an industrial gas conversion job at the Coors Porcelain Co., Golden, which will add a yearly load of 84,000,000 cubic feet of gas.

The plant formerly burned oil, and the change over was made, according to C. W. Gale, superintendent of the company's industrial department, without halting the operations of the plant, by converting two of the six oil burners at a time.

Henly Gets Butane Franchise

H. H. Henley of Minneapolis has been granted a non-exclusive franchise for the service of butane gas in Detroit Lakes, Minn.

Eighth Annual S. W. Gas Measurement Course

The eighth annual Southwestern Gas Measurement Short Course is announced by Dean J. H. Felgar of the College of Engineering, University of Oklahoma, Norman, for April 21, 22 and 23, 1931. This short course offers instruction concerning the latest developments affecting this subject. Manufacturers of gas measuring appliances cooperate with the college by installing their latest equipment and sending factory representatives to demonstrate their use. Twenty-two states were represented in the registration last year with two men from foreign countries. Professor W. H. Carson of the University engineering faculty is director of the course.

Novel Cooperative Exhibit

Portland Gas and Coke Co., Portland, Ore., recently placed a novel cooperative exhibit in its display windows in several towns of districts served by the company, in the form of gas fired chicken brooders. The equipment was placed in the company's windows in Portland, Gresham, Salem, Albany, Corvallis and Hillsboro, Ore., and in Vancouver, Wash. Chicks were furnished by local poultry producers and feed for them was supplied by a local milling company.

Two More Applications Granted

Natural Gas Corp. of California has been granted a franchise for the service of butane gas in Blythe, Cal., in the Imperial Valley. Work was expected to begin before the first of February on the plant and distribution system. The company has also been granted a franchise in Jackson, in the northern part of the state.

Mid-West Regional Gas Sales Council

THE Fifth Mid-West Regional Gas Sales Conference, sponsored by the Commercial Section of the American Gas Association, will be held at Hotel Sherman, Chicago, Ill., February 12 and 13. Because 1931 will be a transition period from manufactured to mixed or natural gas distribution for many Mid-West companies the discussion of sales and other related activities during the change-over will form an important part of the conference program.

Following is the tentative program for the Conference:

THURSDAY, FEBRUARY 12 1931

9:00 to 10:00 A.M.

Registration.

10:00 A.M.

Opening remarks by the Chairman, C. A. Nash, The United Light & Power Co., Davenport, Ia.

"What's Ahead for the Gas Industry," R. W. Gallagher, vice-president, American Gas Association, Cleveland, Ohio.

"Natural Gas—Its Significance to Mid-Western Cities," B. J. Denman, vice-president, The United Light & Power Co., Chicago, Ill.

"Changing Over Consumer Equipment to Natural Gas," F. J. Gunther, Iowa-Nebraska Light & Power Co., Lincoln, Neb.

2:15 P.M.

Presiding: R. O. Jasperson, Milwaukee Gas Light Co., Milwaukee, Wis.

"Developing Natural Gas Sales After Change-Over," J. J. Brennan, Memphis Power & Light Co., Memphis, Tenn.

"In Independence, Missouri," L. L. Garner, Jackson County Light, Heat & Power Co., Independence, Mo.

"In Eastern Nebraska," Stanley Taber, Iowa-Nebraska Light & Power Co., Lincoln, Neb.

"Preparing for House Heating With Natural Gas," J. D. Preble, Public Service Co. of Northern Illinois, Chicago, Ill.

FRIDAY, FEBRUARY 13, 1931

9:30 A.M.

Presiding: C. A. Luther, The Peoples Gas Light and Coke Co., Chicago, Ill.

"Load Building Through Group Appliance Selling," F. M. Rosenkrans, Gas Service Co., Kansas City, Mo.

"Meeting Today's Competition," T. F. Kennedy, Henry L. Doherty and Co., New York, N. Y.

"Every Employee a Salesman," W. A. Brandt, North Shore Gas Co., Winnetka, Ill.

2:15 P.M.

Presiding: F. M. Rosenkrans, Gas Service Co., Kansas City, Mo.

"The Conversion Burner for Rapid Load Building," J. A. Bell, Kansas Pipe Line & Gas Co., Salina, Kans.

"Campaigning for House Heating in Washington," A. Ewaldson, Washington Gas Light Co., Washington, D. C.

Preparing for Saskatchewan Line

SASKATOON, the second largest city in Saskatchewan, and the second largest city in Canada without gas service, will vote upon a natural gas franchise February 16.

The Tri Cities Utilities Ltd. (Moore interests) has negotiated a 20-year franchise agreement with the city council and the matter will be voted upon by the burgesses. Regina, the capital of the province, is negotiating a similar agreement with the same company and if it is concluded, the project, which contemplates one pipe line from the source of supply in Alberta, will go before the provincial legislature for final ratification.

Saskatchewan is the last province in the Dominion to grant any kind of a gas franchise while its neighboring province, Alberta, has enjoyed natural gas service for more than 20 years. Indications of gas sands similar to those yielding huge quantities of gas in Alberta, have led cities and governments to refuse all applications for manufactured gas franchises or importation of natural gas, in the hopes that local resources could be developed.

Four different applications were made to the two Saskatchewan cities within the last few months and on the favorable report of Herbert R. Davis, consulting engineer of Buffalo, the Saskatoon city council set aside other applications and negotiated a 20-year agreement with the Tri Cities Utilities.

If the vote is favorable February 16 the Moore interests will start construction of a 378-mile pipe line from the Wainwright-Kinsella field in Alberta. A line of 235 miles will bring gas into Saskatoon and serve four or five small towns on the way. It will require an extension of 143 miles to serve Regina. Gas will be piped from the field at 250 pounds pressure, reduced to 25 pounds for city distribution and delivered at 4 ounces for domestic consumption. The scheme contemplates an ultimate investment of $17,000,000 and will serve a territory with more than 125,000 population.

The franchise agreement is for 20 years but includes a proviso that the city of Saskatoon can buy out the company at the end of 10 or 15 years at a fair value plus 10 per cent.

The chief opposition to the scheme is coming from Alberta coal interests as coal now has practically a monopoly in Saskatchewan, and gas is being offered at competitive rates for house heating.

Tri Cities has undertaken to assist in developing Saskatchewan's gas resources if gas can be found in commercial quantities and already has made arrangements with four or five small organizations to promote drilling.

Under the agreement the company will be ready to serve by June 30, 1932.

Oklahoma Natural Supplies Gas to Needy Families

The Oklahoma Natural Gas Corporation, in an endeavor to alleviate suffering this winter, is supplying free gas service to needy families on its lines.

Oklahoma Natural's plan is to work in cooperation with regularly organized charity agencies in the cities in establishing a system of extending credit to those who are unable to meet their gas bills when they become due or, if necessary, to furnish free gas for a certain period. A committee of representatives from the charity agencies and the Oklahoma Natural will investigate and pass on applications for this gas service relief.

The plan will be in effect in all the cities and towns in Oklahoma served by the company.

W. A. Kohlhoff Sales Engineer for Hydrauger Corp.

W. A. KOHLHOFF has been appointed sales engineer of the Hydrauger Corporation, Ltd., according to announcement from the headquarters of the corporation in San Francisco. He has been in the gas engineering department of the Pacific Gas and Electric Co. for the past 10 years, having been with the Coast Valleys Division of that company before taking up his new work. Mr. Kohlhoff has also served in the North Bay and the San Francisco divisions of the Pacific Gas and Electric Co. His engineering training was received at the University of California.

W. A. Kohlhoff

As sales engineer of Hydrauger Corporation, Ltd., Mr. Kohlhoff soon will make a business tour of the United States to establish distributing agents for the Hydrauger on the Atlantic Coast, in the South and the Middle West.

The Hydrauger is a hydraulic auger for boring horizontally under streets, highways, sidewalks and gardens, for the laying of pipes, condulets and drains. The machine has been placed on the national market, and has won wide attention because of the savings involved in its use through elimination of pavement-cutting.

Montana Power to Proceed with Construction

Montana Power Co., is now planning to proceed with operations on its 250-mile carrier from fields in southern Montana and northern Wyoming, to Butte and Anaconda and points enroute. Reports from the Montana press state that the line will cost approximately $15,000,000.

A court decision upheld the validity of the franchise recently voted by citizens of Butte.

Walthill Service by March 1

Natural gas service is expected to be established in Walthill, Mo., by March 1. Supply will come from the mains of the Missouri Valley Pipe Line Co.'s major carrier, gas being served by the Central States Electric Co.

Lusk Line Construction

Construction of the pipe line which will supply the town of Lusk, Wyo., with natural gas from the Lance Creek Field will be started during the early part of March.

Municipal Ownership Election At Fort Worth, Texas

In a statement made to *Western Gas* on January 28, gas company executives made the following comment on the municipal ownership election held at Fort Worth, Texas, on January 27:

"A straw vote on the question of the city of Fort Worth taking over the gas properties now serving the city was held on January 27. The vote for taking over the properties was 8,075 with 4,511 against.

"The election was merely an expression of opinion on the part of the voters as to whether they would favor the city going into municipal ownership in case the Council could secure a supply and a responsible pipe line comany to bring the gas to the city gates.

"In the minds of most of the voters the real issue seemed to be lower rates, and not municial ownership, as many people held the opinion that a favorable vote would mean giving the City Council a club over the gas company. Leaders of both sides of the question, therefore, were of the opinion that the vote did not indicate the real sentiment of Fort Worth on the question of municipal ownership.

"In a recent decision handed down by three Federal judges, the Fort Worth Gas Co. was granted a raise in rates. The total raise amounted to 57 cents a month per customer. The present rates in Fort Worth are on a par with the rates in other cities which are on a comparable basis with Fort Worth.

"Before the city can take any step toward acquiring the properties of the gas company, it must first obtain a contract with some responsible parties, having adequate financial backing to build a pipe line. Members of the City Council who favored the municipal ownership proposition estimated that this would require at least $10,000,000 with an additional $5,000,000 for purchase of the local distributing company. After securing such a contract for a pipe line supply of gas adequate for Forth Worth, which has a population of almost 200,000, the City Council must then hold an election for a bond issue with which to buy the distributing company.

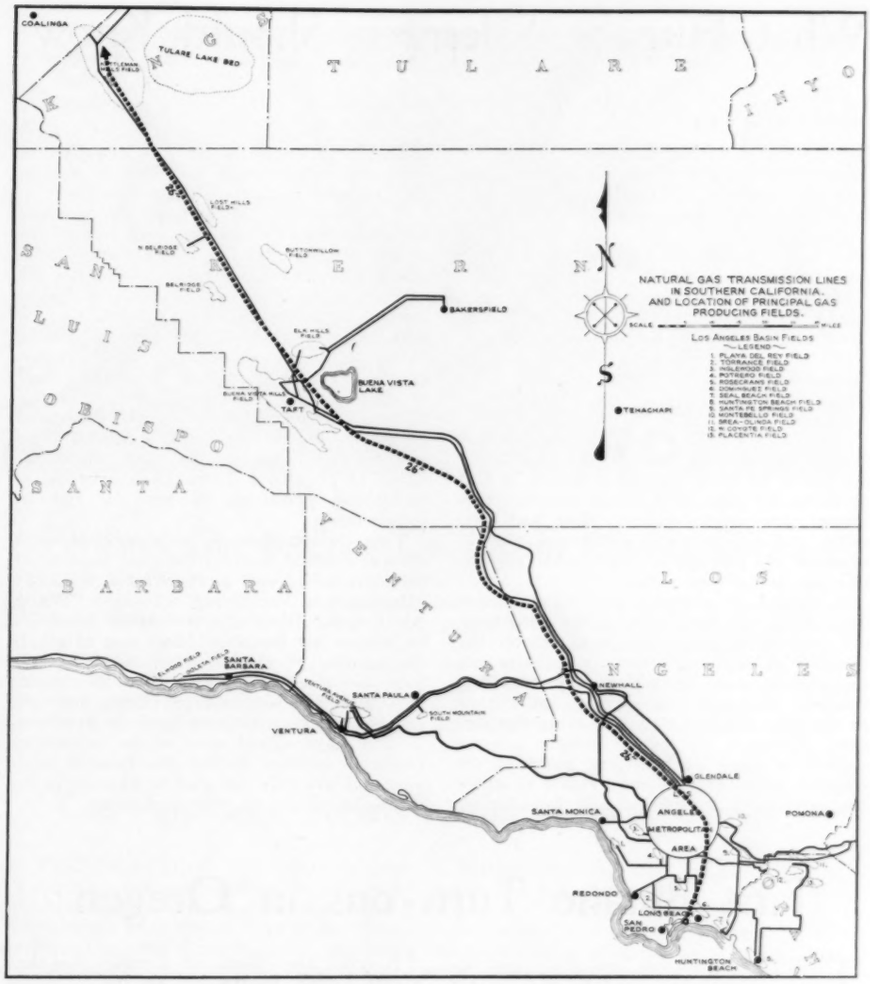
"The Fort Worth Gas Co. did not participate directly in the campaign, its activities being confined to educational advertising about the gas business with no mention of municipal ownership. Business leaders of Fort Worth believe the controversy can be settled without ultimate resort to municipal ownership."

Montana-Dakota Power Co. Gets Minot, N. D., Franchise

Montana-Dakota Power Co., Minnesota Northern Power subsidiary, has been granted a franchise for the service of natural gas in Minot, N. D., clearing the decks for action on the 100-mile carrier from Williston, N. D. In addition to Minot, the line will serve Springbrook, Epping, Wheelock, Ray, Tioga, White Earth, Ross, Stanley, Palermo, Blaisdell, Berthold, Lonetree, Donnybrook, Coulee, Kenaston and Kenmare.

Dexter and Casey, Iowa, Permits

Dexter and Casey, Iowa, have each granted a franchise for the service of natural gas to the Iowa Electric Co. The company has also applied for a permit at Anita, Iowa.



Southern Fuel Line to Begin in April

SOUTHERN FUEL CO., newly organized to lay a gas line from Kettleman Hills to Long Beach, Calif., via Los Angeles, as announced in these columns last month, is preparing to begin actual construction in April.

Officers and directors of the new company were announced in January as follows:

Alexander B. Macbeth, president and general manager.

F. B. Lewis, vice-president and assistant general manager.

George C. Ward, vice-president.

Franklin S. Wade, vice-president.

D. M. Trott, secretary and treasurer.

Directors: R. H. Ballard, Addison B. Day, LeRoy M. Edwards, F. B. Lewis, Alexander B. Macbeth, W. C Mullendore, Franklin S. Wade, G. C. Ward.

Stock of the company is jointly owned by the Southern California Gas Co. and the Southern California Edison Co. interests.

The line will be 210 miles in length, probably of 26-inch diameter. Construction work will be under the supervision of Harrison P. George, chief engineer, and B. M. Laulhere, construction engineer. The sketch map above shows the general route of the pipe line, which will be the largest and longest of its size in the country. It is anticipated many construction difficulties will be encountered in the Tehachapi Mountain section and in the congested areas near Los Angeles.

The capacity of the line will be about one-third of the total amount of gas handled in the Los Angeles metropolitan area at present. On account of the rapid depletion of gas producing areas in the Los Angeles Basin, this new supply of natural gas will be needed to meet the demands of domestic and industrial customers of the gas companies in southern California, and the fuel requirements of the Southern California Edison Co. steam plant at Long Beach.

The headquarters of Southern Fuel Co. will be on the 11th floor of the Garland Building at 740 South Broadway in Los Angeles.

Gets Operating Permit

The Missouri Valley Pipe Line Co. has been granted a permit to operate in the state of Iowa, and it was expected that a franchise application would be placed on file at Sioux City before the end of January.

Ceres Franchise Purchased

Permission has been granted by the California Railroad Commission to the Southern California Gas Co., Los Angeles, to sell its franchise rights for the distribution of gas in the city of Ceres, Stanislaus County, to Pacific Gas and Electric Co., San Francisco.

What Furnace Salesmen Should Know

(Continued from Page 38)

Electric control valves, installed.
Control switches and wiring installed.
Vent pipe per foot, different sizes.
Roof caps and flanges (lead flashed or plain).
Price per opening and cutting register and vent openings.

Make notes from time to time of various items which enter into the cost of an installation and set a price on each item.

Pricing as Units Helps Estimating

It will simplify and expedite the estimating of jobs, if some parts of the installation are priced as units, such as a run of 12 feet of warm air pipe, of a given size with two elbows, one angle register, boot and box, collar and damper, with additional pipe at so much per foot extra. Unit prices such as this are a big time saver.

Being able to engineer the job and quote the price of the installation at the same time, not only saves time, but it eliminates the necessity of injecting other personalities into the picture, some of which may be objectionable. The prospect may be enthusiastic at the time the salesman is making the survey. However, if several people are required to quote on different parts of the contract sufficient time may elapse to allow his enthusiasm to subside and considerable additional sales effort may be required to bring his interest back to where it was in the first steps of the sale.

It is therefore obvious that the greatest success of the furnace salesman lies in his ability to handle the job in its entirety, independent of outside assistance, until after the sale is made. With the assurance of knowing his business, he will approach the job with greater confidence, his capacity will be enlarged by the time saved and, greatest of all, from his standpoint, is his increased earning power. Obviously the successful salesman cannot be satisfied with a superficial knowledge of the ramifications of warm air gas furnace heating. He must make the effort to acquire a thorough knowledge of everything pertaining to his job and its requirements.

This information is available through several reliable sources: the most popular of these are books, such as Harding & Willard's "Heating and Ventilating"; Daniel's "Warm Air Furnace Heating"; and Miles' "A.B.C.'s of Warm Air Heating." But, best of all, is the solution of specific problems. The furnace manufacturers, especially if they maintain retail and service departments, are most reliable in the solving of intricate problems, as they have solved most of the perplexing problems incident to the gas furnace business and are only too glad to pass on to the trade the results of their experience.

First Butane Turn-ons in Oregon

THE past month has seen the inauguration of liquefied natural gas service from air-butane plants by the Natural Gas Corp. of Oregon. The first Oregon town to have this new service is La Grande, where gas was turned into the distribution system on January 20, closely followed by the beginning of service at Klamath Falls on January 22.

City officials at newly opened Klamath Falls, Ore., gas plant of Natural Gas Corp. of Oregon.

Natural Gas Corp. of Oregon also has plants under construction in the cities of Bend, Coquille and Cottage Grove, which will be completed within the next few weeks, with 1931 plans calling for the construction of a number of additional plants throughout the area.

Open house celebrations have been features of the opening of new stores and gas appliance displays in the various communities to be served with butane gas by Natural Gas Properties, Inc., parent organization of the Natural Gas corporations.

Several of these have been held during the past month, including Klamath Falls, La Grande and Bend in Ore., Dunsmuir and Yreka in Calif., with similar affairs planned for the many other stores to be opened throughout these two states, as well as in the state of Washington during the next few weeks.

Service was turned on in La Grande and Klamath Falls with fitting ceremonies participated in by city and company officials, among those in attendance being Executive Vice-President R. E. Aitcheson, General Superintendent E. M. Lindsey and Merchandise Manager T. E. Bartlett of San Francisco, and A. E. Strong, in charge of operations for the Natural Gas Corp. of Oregon and its affiliated company, Natural Gas Corp. of Washington.

Approximately 2,000 residents in La Grande have already signified their intention of taking advantage of this new service, while more than 2,800 have signed for service in Klamath Falls.

Rates for butane service have just been put on file with the Oregon Public Service Commission.

Pomona District to Have $135,000 Improvements

In its Pomona district the Southern Counties Gas Co. of Los Angeles, Calif., contemplates an expenditure of over $135,000 to cover the construction of a new district headquarters office building, the erection of a new warehouse, and general improvements and extensions over the district's system.

The site purchased for the erection of the new headquarters building is 120x193 feet, located at the southeast corner of Holt Avenue and Main Street in Pomona.

M. R. Thompson, vice-president and engineer in charge of construction, has prepared plans for the building, which will be under construction within the next 30 or 60 days, and will cost approximately $70,000.00. The structure will be Class A, of reinforced concrete, two stories in height. There will be a display lobby with a 50-foot frontage and 32-foot depth. This portion of the building will be a full story and a half with no floor above. In the southeast corner of the office a semi-circular stairway will lead to the second floor and auditorium. On the east side of the lobby an attractive fireplace will be constructed.

The second story is to be set 32 feet back from the street front, so that it will not be located over the display lobby. The stairway from the main floor will lead to an auditorium planned for the forepart of the second floor. In the center of the east end of the auditorium a modern stage with a model kitchen will be constructed. The auditorium will seat 250.

Panhandle Eastern Line Complete to Mississippi River

Completion of the Panhandle Eastern Pipe Line Co.'s major carrier from Texas fields to the Mississippi River was scheduled for the last of January or the first of February, according to a statement made to *Western Gas* by Luke J. Scheer, director of Public Relations for the company, on January 22. The line is expected to be continued to tie-in with the Missouri-Kansas Pipe Line Co.'s system in Indiana, which is now being supplied with gas from Kentucky fields. The Panhandle-Eastern line is jointly owned by Missouri-Kansas Pipe Line Co., and Columbia Oil & Gasoline Co., subsidiary of Columbia Gas & Electric Corp.

The line running from Stinnett in the Texas Panhandle to Louisiana, Mo., on the Mississippi River is 667 miles long. This main line is of 24-inch pipe. Approximately 25 laterals are in the process of construction from the main line to towns and cities in Kansas and Missouri, including Mildred, Kansas and Jefferson City and Moberly, Bowling Green, Mexico and Louisiana, Mo.

Propane-Butane Contracting Corp. Formed

The Propane-Butane Contracting Corp. has been formed by associates of the C. M. Kemp Manufacturing Co., and will engage in planning and supplying equipment for butane-air gas dilution; in building complete butane-air gas dilution plants; and in arranging contracts for and supervising the construction of such plants. The company is headquartered at 405 East Oliver Street, Baltimore, Md.

N. W. Cities Personnel Changes

N. B. Talbot has been named manager of the Northwest Cities Gas Co. at Astoria, Ore., succeeding J. P. O'Neill, who is now manager for the company at Lewiston, Ida.

Missouri Assn. of Public Utilities to Meet April 16-18

The 25th Annual Convention of the Missouri Association of Public Utilities will be held at Excelsior Springs, Mo., on April 16, 17 and 18.

A tentative program was outlined by the Program Committee at a meeting January 14 in Jefferson City, Mo.

Among the speakers on the program will be:

Alexander Forward, managing director of the American Gas Association, "What the Gas Industry Means to the Development of Missouri."

Paul S. Clapp, managing director of the National Electric Light Association, "Greetings to Missouri Utilities."

Ralph R. Parks, farm electrification specialist, Missouri College of Agriculture, "Rural Electrification in Missouri."

The committee arranging the program is composed of: Dudley Sanford, St. Louis County Gas Co., Webster Groves, Mo., chairman; H. H. Kuhn, Kansas City Power & Light Co., Kansas City, Mo.; L. W. Helmreich, Capital City Water Co., Jefferson City, Mo.; and H. G. Wehnert, Laclede Gas Light Co., St. Louis, Mo.

Members of the Entertainment Committee are: Hermann Spoehrer, Union Electric Light & Power Co., St. Louis, Mo., chairman; Paul C. Ford, Kansas City Gas Co., Kansas City, Mo.; J. B. Rogers, Missouri Power & Light Co., Excelsior Springs, Mo.; John P. Casey, Graybar Electric Co., St. Louis, Mo.; and B. W. Frauenthal, St. Louis Public Service Co., St. Louis, Mo.

H. M. Patton, of the Union Electric Light & Power Co., St. Louis, Mo., is president of the Association; F. D. Beardslee, St. Louis, is secretary; and Jesse Blythe, Jefferson City, assistant secretary.

Central Montana Utilities Plans Lewistown Line

Central Montana Utilities Co., subsidiary of Minnesota Northern Power Co., has begun operations looking toward the construction of a natural gas transmission line from Great Falls to Lewistown, where a franchise is held by the company. The progress of the main survey will depend somewhat upon weather conditions, but a tentative route takes the line through Belt, Raynesford, Stanford, Moccasin, Hobson, Moore, Hanover and other towns. Preliminary work in Lewistown will proceed through the winter, where the company will complete a survey to ascertain the possible load. It is expected that the 100-mile line will be of 8-inch pipe, and will be completed in 150 working days.

Shell Oil Co. to Buy 11,000,000 c.f. Daily

Shell Oil Co. has contracted with Standard Pacific Gas Line, Inc., of San Francisco, to purchase upwards of 11,000,000 cubic feet of gas daily from the gas transmission line of the company for use in the Shell nitrogen fixation plant at Martinez. The initial load under the contract will approximate 3,000,000 cubic feet daily.

Date Set for Poplar, Mont. Franchise Election

Poplar, Mont., has set the date of April 6 for election to decide if the franchise asked by the Bowdoin Utilities Co., will be granted.

Portland Gas & Coke Co. Opens District Office

PORTLAND Gas & Coke Co. of Portland, Oregon, opened branch headquarters on January 19 in the city of Forest Grove, about 26 miles west of Portland in the Tualatin Valley.

To acquaint the surrounding territory with this fact, a parade was arranged, participated in by 23 members of the gas company's sales department and the mayor of Forest Grove and the president of the chamber of commerce.

The store is on the principal street of the city—its prominent location designed to impress the fact that gas is the modern fuel.

Gas Appliance Society's Annual Sales Dinner

APPROXIMATELY 375 gas appliance dealers, manufacturers and gas company employees assembled at the Gas Appliance Society's sales dinner held in the Commercial Club, San Francisco, on Wednesday, January 7.

The meeting was designed primarily so that the dealer cooperative sales program of the Pacific Gas and Electric Co. could be explained in detail to the plumbing, heating and furniture trades. George Egleston, toastmaster of the evening, was introduced by O. C. Bunster, and in turn introduced the various speakers who included Al Joy, R. E. Fisher, Frank Runyan, C. B. Babcock and A. F. Hockenbeamer.

R. E. Fisher explained that portion of the company's 1931 sales program which has to do with dealer cooperation. In order to eliminate as far as possible competition between gas company salesmen and dealers, a new system has been worked out to compensate the employees of the utility for their sales efforts in all metropolitan districts. Instead of being paid a commission on all sales made by the company salesmen, they will now be compensated on a bonus system based on the estimated gas consumption of any appliances sold, regardless of whether they are company sales or dealer sales.

Representatives of both the Furniture Dealers Association and the Gas Appliance Society expressed themselves as being highly gratified at the liberal policy announced and pledged their respective memberships to intensive sales activities in support of it.

So that those present might gain an adequate conception of the market existing for gas appliances, it was pointed out that only 52 per cent of P. G. and E. consumers are using cabinet type ranges and a quota of 25,000 ranges to be sold by company and dealers has been set for 1931. Twenty-five per cent of P. G. and E. consumers are using automatic water heaters and a quota of 12,000 has been set in this field.

Further estimated sales include 5,500 furnaces and boilers and 15,000 small heating appliances of various types.

An enjoyable feature of the evening was the presentation of a complete Pacific Coast Gas Association broadcast by artists who regularly present this program on the National Broadcasting Co.'s "Women's Magazine of the Air."

Colorado Natural Gas Co. Preparing for Construction

Bids will be called in March on the Colorado Natural Gas Co.'s 212-mile line from Hugoton fields to Colorado Springs, Colo. The Colorado Springs franchise calls for the delivery of gas in that city by August 1, 1931. The route of the main line will lie in a direct course from Hugoton northwest to Colorado Springs, crossing the Arkansas River near Fort Lyon and running three miles east of the Fountain River, at Fountain. Cost of the line is estimated at $3,000,000.

Franchise Asked for Industrial Service in K. C.

The Industrial Engineering Co., according to press reports, has applied for a franchise to serve natural gas for industrial purposes in Kansas City, Mo. The company, according to reports, would serve gas at 25 cents a thousand cubic feet, and is prepared to deliver 50,000,000 feet daily to Kansas City industries.

Casa Grande, Ariz., to Vote

Casa Grande, Ariz., will vote on February 12 on the franchise application filed by the Arizona Edison Co., for the service of liquefied natural gas in the town.

Pacific Gas and Electric Sets Quota of $4,287,000 in Increased Revenue

TO double the use of natural gas for house heating is the keynote of the 1931 sales objective of the Pacific Gas and Electric Co., as announced by R. E. Fisher, vice-president in charge of public relations and sales, at the company's "Business Boosting Convention," held in the Palace Hotel, San Francisco, on Monday, January 5. Speakers of the evening included President A. F. Hockenbeamer, First Vice-President and General Manager P. M. Downing, Vice-President R. E. Fisher and General Sales Manager H. M. Crawford.

For 1931, gas sales executives of the company have set up a budget of $617,820, this amount being subdivided as shown in Table No. 1.

In addition to this, there is a combined budget of $65,885 for combination gas and electric sales endeavor covering commercial cooking and baking, $47,885, and dealer cooperative plan, $18,000. Assuming that half of the combination budget will be expended on gas activities, the total plans will include the employment of 227 men and the expenditure of $650,765, as compared to last year's budget of $524,000.

The attainment of a total increased revenue quota of $4,287,000 will be sought through three major sales activities: First, direct selling by the companies; second, extensive dealer cooperation; and third, general employee sales.

A pronounced effort is being made to stimulate the interest of the 16,000 Pacific Gas and Electric Co. employees in the bonus system which is in effect. To dramatize the possibilities of the increased income that can be made through the earning of bonuses, a complete road show in five acts has been created and is being carried to every division over the company's system. The stage manager and director of the performance is Frank Bevan. A preview of this show was one of the features of the meeting in San Francisco.

For the second consecutive year, the A. F. Hockenbeamer sales trophy was awarded to the Shasta division for the best overall results on gas and electric sales during the year.

A total increase in added domestic revenue amounting to 151 per cent of the quota set for the year is shown by the recapitulation of the 1930 sales figures of the company. The rapid acceleration of this utility's appliance sales over the past 3 years is graphically illustrated by the comparisons given in Table No. 2 furnished by A. C. Miller, domestic sales engineer, who has been given charge of these activities.

Whereas in 1929, 80 per cent of all furnace installations in the company's territory were for coal or wood, in 1930, 80 per cent of all installations were gas-fired.

The success of the 1929 season, as explained by Mr. Miller, lay in the fact that there was a sales drive in force practically every month of the year. New quotas were set up monthly on conversion burners sales, with prizes for salesmen, bonuses for employees turning in prospects and other promotional activities. There were two major heating campaigns, one during the months of July and August and one during September, October and November.

An average sales force of 95 men was kept busy on appliance sales and approximately 100 on conversion burners.

It has been further estimated that the combined efforts of the gas company and the gas appliance dealers during 1930 have resulted in an added domestic revenue of $2,498,417.

One of the most outstanding merchandising successes of the year was the sale of 12,331 conversion burners against a quota of 10,000.

As part of its cooperative campaign with the dealers the gas company makes an effort to keep active check on the total gas appliance sales over all of its system, whether made by company salesmen or by dealers. The figures shown in Table No. 3 serve as an index of the manner in which the sales are being handled.

Table No. 1

Appliances	*Man Power*	*Budget*		*Revenue Quota*
Domestic Heating & Appl.	57	$157,700		$1,107,000
Domestic Conversion Burners	79	122,360		560,000
Commercial Building Heating	49	175,000		820,000
Industrial & Surplus	29	145,030		250,000
			Firm Surplus	1,350,000
Gas Extensions	7	17,730		200,000
Total Gas	221	$617,820		$4,287,000

Table No. 2

	1928	1929	1930
Merchandise sold	$470,000	$1,013,971	$2,127,737
Added domestic revenue quota	.....	360,000	1,236,650
Added domestic revenue results	280,000	413,835	1,873,417

Table No. 3

Appliances	*Pacific Gas and Electric Co.*	*Dealers*
Conversion burners	12,331	400
Floor furnaces	2,322	3,525
Circulating type heaters	2,492	2,550
Radiant heaters	2,006	not available
Furnaces and boilers	935	3,952
Gas ranges	2,978	17,650
Automatic water heaters	2,251	9,500

Gilmore Co. Organizing Subsidiary Corporations

Chester A. Sheppard, president of the Forrest E. Gilmore Co., in January announced recent action of the board of directors in authorizing the organization of subsidiary domestic corporations. The Gilmore Co. is a $4,000,000 concern owned by Pacific Northwest capital, and is now operating principally in the states of Oklahoma and Texas, extracting gasoline from natural gas. According to the plan, the subsidiary corporations will make use of equipment not now being utilized by the company in that territory. The Gilmore company and its subsidiary interests will participate in these new projects on a pro-rata basis with the connections furnishing the necessary construction funds.

The first of these new subsidiary operations has already been started by the signing of a contract for the erection of a plant on the pipe line recently built between the Holdenville gas area and the city of Ada, Okla., Mr. Sheppard announced. Several others are expected to be under way in the near future, thus making use of company equipment now idle.

R. M. McCalley, who has been the Gilmore company's manager in the mid-continent area, was elected vice-president and general manager of the company's operations by the board of directors. Mr. McCalley was formerly with the Portland Gas & Coke Company as superintendent of distribution.

Eleven Months' Sales Up 48 Per Cent

Memphis Natural Gas Co., Memphis, Tenn., reports sales for the 11 months ended November 30, 1930, of 8,047,711,900 cubic feet, compared with 5,410,087,373 cubic feet for the corresponding period of 1929, an increase of over 48 per cent. It is expected that when sales figures for December are compiled they will exceed a billion cubic feet for the month, due to the increased cold weather heating load.

Well Proves Shawnee Structure for Natural Gas

Announcement was made early in January of the bringing-in of a 1,000,000 cubic foot gas well on the Shawnee structure between Douglas, Wyo., and the Lance Creek oil field. Phillips Petroleum Co., is owner of the well, controlling some 20,000 acres in the territory.

Cooperative Appeal to Be Launched in February

Cooperative gas advertising in Los Angeles county, Calif., will get under way late in February, if the plans of the committee representing the three companies involved in the effort, develop as expected. F. H. Holden, superintendent of advertising and publications for the Southern California Gas Co., is chairman of the inter-company company with D. L. Scott, manager of public relations, Los Angeles Gas and Electric Corp., and W. D. Thurber, advertising manager, Southern Counties Gas Co., completing the committee.

F. H. Holden

As announced in *Western Gas* for January, the three companies named above have appropriated $117,000 for a cooperative advertising appeal directed especially to domestic consumers in their mutual service area during 1931. Metropolitan newspapers will be employed in Los Angeles County, exclusive of the city of Long Beach. Full details of the campaign will be covered in the March issue.

Lakeview Gas Co. Completes Butane Plant

The Lakeview Gas Co., Lakeview, Ore., has completed a plant for the distribution of liquefied natural gas in that town. W. W. Wheeler of Berkeley, Calif., was engineer in charge of construction, with Parsons Engineering Co., of San Francisco, acting as consulting engineers.

The plant has butane storage capacity for 15,000 gallons, and is provided with two high-pressure storage tanks of 1,000 cubic feet each. Preparations have been made to serve a potential load of 550 domestic consumers.

Portland-Devine Line Complete

Work on the $500,000 Devine-Portland natural gas line of Colorado Interstate Gas Co. of Colorado Springs, was reported completed in January. This line will serve the Colorado Portland Cement Co.'s plant and will be placed in service by March 1. Supply comes from the Amarillo-Denver major carrier.

Mid-West Natural Gets Two More Franchises

Mid-West Natural Gas Co. has been granted franchises at Albion and Wayne, Neb., and has applications pending in several other towns, among them Valley and Madison.

Minco, Okla., Franchise Asked

Western Service Corp. has applied for a franchise for the service of natural gas in Minco, Okla.

Fontanelle Grants Permit

Central States Electric Co. was granted a natural gas franchise at Fontanelle, Iowa.

Liquefied Petroleum Gases

(Continued from Page 36)

other gases were allowed to escape at ordinary temperature and pressure, accompanied by a large amount of the gasoline vapor, until the gasoline was stable enough for sale.

Eventually the process of submitting these escaping gases to "fractional distillation" was introduced, primarily for the purpose of recovering the gasoline they carried with them. Fractional distillation (or rectification) is the general process for separating liquids of somewhat different boiling points which occur together in solution by repeatedly evaporating and condensing portions of the mixtures. It is a process widely applied in the chemical industries; its most familiar examples are the separation of alcohol and water, and the preparation of oxygen by the fractional distillation of liquid air.

At first fractional distillation appears to have been used only to prevent the loss of gasoline during the removal of propane and butane, which were returned to the natural gas line. Later the mixture of propane and butane with some ethane and pentane, liquefied together, began to find a market; but it was not long before the advantages of a complete separation of the gases, and their marketing as separate products, became apparent. This complete separation, like the partial separation first used, is accomplished by fractional distillation. At the present time both the mixed gases and the pure substances propane, butane, and pentane, are being marketed in large quantities.

Available Supply

Table No. 2 gives information from a recent news bulletin of the Bureau of Mines on the rapid development, in recent years, of the sale of these liquefied gases.

Table No. 2. Marketed Production of Liquefied Petroleum Gases

Year	Gallons
1926	465,068
1927	1,091,005
1928	4,522,899
1929	9,925,698

Nearly all of the present commercial supply is obtained from natural gas, but gases produced in petroleum refineries constitute a large potential source of the material. It is reliably estimated that available sources in this country are capable of supplying liquefied petroleum gases having a heating value considerably in excess of the total manufactured gas supply. This means that all homes in the United States not now connected with mains supplying natural or manufactured gas, could readily be supplied with bottled gas service.

The most important use of liquefied petroleum gas promises to be that of bringing the advantages of gas service for cooking, water heating, and refrigeration to homes beyond the reach of city gas mains.

Propane Use

For these domestic uses a supply of propane is almost ideal. It is as satisfactory in every respect, except cost and the inconvenience of replacing empty cylinders, as the best manufactured or natural gas service. Because of the uniform composition of propane and because of the uniform pressure assured by regulators and an always adequate pressure at the source of supply, it is possible to design and adjust appliances to burn propane with a high degree of efficiency.

Butane

Pure butane is not much used for isolated domestic service because temperatures too low to give adequate pressure are frequently encountered. Butane, therefore, finds its market principally for the enrichment of city gas supplies and for use by industries which arrange to maintain the desired pressure either by heating the liquid or forcing it to the burners under pressure provided mechanically. It has been extremely satisfactory for such service because of its uniformity.

Butane is also being extensively used to supply gas service from a central station to communities too small to support a manufactured gas plant of the usual type. In these small plants butane is usually mixed with air in certain proportions, and the mixture is metered to the customers as in the case of any other city gas supply. The air in this case serves mainly to prevent the condensation of the butane. Whereas pure butane cannot be supplied without condensing at a temperature below 33° F, a mixture of butane and air having, for example, a heating value of 600 B.t.u. per cubic foot can be delivered without condensation at a temperature of −46°F. These mixtures of butane and air have proved economical for small communities because the plant in which they are prepared are simple, inexpensive, and practically automatic in operation.

Pentane

Pentane is used to a considerable extent for supplying individual dwellings by passing air through the pentane container (usually bubbling it through the liquid) and using the resultant mixture of air and pentane vapor as the mixtures of butane and air are used from the small city plant. This system, of course, requires a means for mechanically supplying air under pressure. Aside from this requirement, the principal disadvantage of the system is the variability of the mixture with variations of the temperature of the pentane. Usually the pentane tank is buried deeply in the ground to reduce temperature changes.

The pentane systems are essentially the same as the systems for supplying air saturated with gasoline which have been in use in many places for 30 years or more. Old plants of this type can be used with pentane with an improvement in constancy of the gas supplied. Where substitution of pentane is made, appliances have to be readjusted to take more air into the burner because of the greater proportion of fuel in the mixture supplied to the burner.

Mixed Petroleum Gases

Petroleum gases which have not been completely separated into their constituents, but remain mixtures, are practically as useful for enrichment of manufactured gas supplies as are the pure hydrocarbons, but their use for individual domestic supplies involves considerable difficulty. If such mixtures are allowed to evaporate in the cylinders the gas first delivered is mainly ethane and propane; that delivered when the cylinder is nearly discharged is mainly butane and pentane. Such a variation in composition is too great to permit the satisfactory adjustment of appliances, hence liquid mixtures of this character are taken from the bottom of the container and vaporized in the line to the burner, usually in a specially arranged vaporizer heated by the burner itself. No appreciable change of composition then results during the discharge of the cylinder. A mixture of this

kind may contain enough ethane and propane to give a satisfactory working pressure. Otherwise, the necessary pressure may be supplied by pumping air into the supply tank. Systems for the use of these mixtures were employed several years before pure propane became commercially available, and several clever inventions were made to cope with the manifest difficulties involved in the control of pressure, the danger of leakage of the liquid from the house piping, etc. Many of the old systems using mixtures appear to have given very satisfactory service, but they can hardly be regarded as serious competitors of a propane system unless there is a considerable difference in the cost of fuel in their favor.

In all cases, liquefied petroleum gases should be purchased by weight. The reading of a pressure gauge gives no indication of the amount of fuel in a container until it is practically empty. The capacities of cylinders range from 25 to 150 pounds, the ones more commonly used contain 60 and 100 pounds.

The cost of pure propane to the consumer for domestic use ranges from about 8 to 15 cents per pound depending upon locality and source of supply. Pentane and mixed hydrocarbons are usually cheaper. For purposes of comparison it may be noted that propane at 10 cents per pound costs $4.63 per million B.t.u. Gas of 600 B.t.u. at $1 per thousand cubic feet costs $1.67 per million B.t.u. Kerosene at 10 cents per gallon costs 78 cents per million B.t.u. Electricity at 3 cents per kilowatt hour costs $8.57 per million B.t.u. Relative efficiencies in use are, of course, to be taken into account in judging the cost of service.

The discussion on "bottled" gases, as contained in the Bureau of Standards Letter Circular No. 292, will be concluded in next month's issue.—*Editor.*

Federal Regulation of Gas Lines

(Continued from Page 39)

ing their rates to local consumers, their jurisdiction must in all cases be immediately thrown back upon the question of the price for transmitted natural gas, which price is dependent upon the act of some Federal commission or body, will it not be a fact that the jurisdiction of the local body, will necessarily be deferred until the gate rate has been fixed at Washington? Furthermore, any rate fixed either by the Interstate Commerce Commission or some other regulatory body will, if the matter has become one of serious contention, be appealed to the courts, and while it rests with the courts for determination the local State commission will be delayed in exercising their important jurisdiction.

"The same gas, passing through the same pipes at the same time, has different values for its various uses, and in its major aspects the rates it secures are competitive and self-regulating and in no sense monopolistic. The regulation of the price of gas to the distributing company buying the supply in interstate commerce is of minor importance, since the consumers of at least 81 per cent (industrial users) of it will not use it unless it is sold at a price at which it competes with other fuels.

"Domestic gas costs more to deliver at the city gates than does industrial gas, because of its poor load factor, not only to the line but to the producers in the field. Often the industrial gas is sold with the right to cut off the supply in favor of the domestic consumer."

The following pertinent quotation was made by Mr. Forward, from an address by Hon. J. Paul Kuhn of the Illinois Commission, at the recent convention of the American Gas Association:

"Again, a federal organization, which is sufficiently manned to properly conduct all investigations now being carried on by the state bodies, would be so cumbersome and so unwieldy that intimate understanding of the problems would scarcely ever be obtained. Individuals, peculiarly possessing knowledge which would be especially helpful in the solution of those problems, could scarcely ever be heard, and as a result, conclusions arrived at would be less satisfactory to all and much delay would be occasioned in an effort to secure all of the facts."

On Pacific Coast Trip

F. H. Thomas of Mount Vernon, Ohio, vice-president of The Cooper-Bessemer Corp.; H. A. Gehress, chief engineer, also of Mount Vernon, and T. F. Hudkins of Tulsa, western sales manager for the company, were in Los Angeles, Calif., early in February, visiting Jim Reed, manager of the Los Angeles office of the corporation.

Imperial Gas Co. is Completing Plant at Shiprock

The Imperial Gas Co., Long Beach, Calif., is completing a plant for the purpose of marketing bottled gas on the Rattlesnake lease of the Continental Oil Co., west of Shiprock, N. M. The capacity of the plant is about 3,000 gallons daily. L. F. Heggen is manager of the plant.

So. Calif. Gas Co. Financing

Southern California Gas Co., Los Angeles, Calif., has applied to the State Railroad Commission for authority to issue 32,000 shares of its common capital stock for the sum of $3,200,000. Authority is also asked by the company to issue $12,500,000 of first mortgage and refunding 4½ per cent 30-year gold bonds. The company plans to use the proceeds for certain capital expenditures.

Annual Distribution Conference April 8, 9, and 10

The Annual Distribution Conference of the American Gas Association will be held at the new St. Nicholas Plaza Hotel in Cincinnati, Ohio, April 8, 9, and 10. The conference is held each year in a different section of the country, last year's session being held at St. Louis, Mo.

Armells Petroleum Wants Lewistown Permit

Armells Petroleum Co., has filed an application for a natural gas franchise in Lewistown, Mont. The company plans to supply gas from wells of the Sabine Construction Co., about 35 miles away.

C. D. Bell Resigns from So. Cal. Gas Staff

Chas D. Bell, who has been with the Southern California Gas Co. since October, 1917, for the past several years as superintendent of distribution in the company's central division, resigned effective December 31.

Mr. Bell began his work in the gas industry in Pittsburgh, Pa., and was later located in the Kansas and Missouri district for a number of years, following which he came to the west coast. He is a member of the American Gas Association and the Pacific Coast Gas Association, having been active in the latter organization's committee work.

Completion of United's Huntsville Line Announced

United Gas Co.'s line from Palestine to Huntsville, and other towns in eastern Texas, is now completed, with service established in most of the towns on the route of the line, including Grapeland, Crockett, Elkhart, and Huntsville. United Gas Distributing Co., is serving the towns.

Add 472,817,000 c.f. to Industrial Load in 1930

The Industrial Department of the Coast Counties Gas and Electric Co., Santa Cruz, Calif., reports a total of 88 industrial gas consumers added to the company's lines in 1930, with a total load of 472,817,000 cubic feet per year.

Longmont, Colo., Grants "Natural" Permit

Longmont, Colo., on January 13 voted a 20-year natural gas franchise to the Public Service Co. of Colorado. A pipe line to connect the town with the Colorado Interstate Co.'s line from Amarillo fields will be constructed early in the spring.

205 New Gas Wells in Monroe Area in 1930

The Natural Gas Co. of Monroe, La., through Alston Prophit, manager of public relations for the company, reports that 205 new gas wells were brought in in the Monroe area during the past year, giving an additional supply of 4,236,774,638 cubic feet.

Merchandise Sales Up 6.2 per cent Over 1929

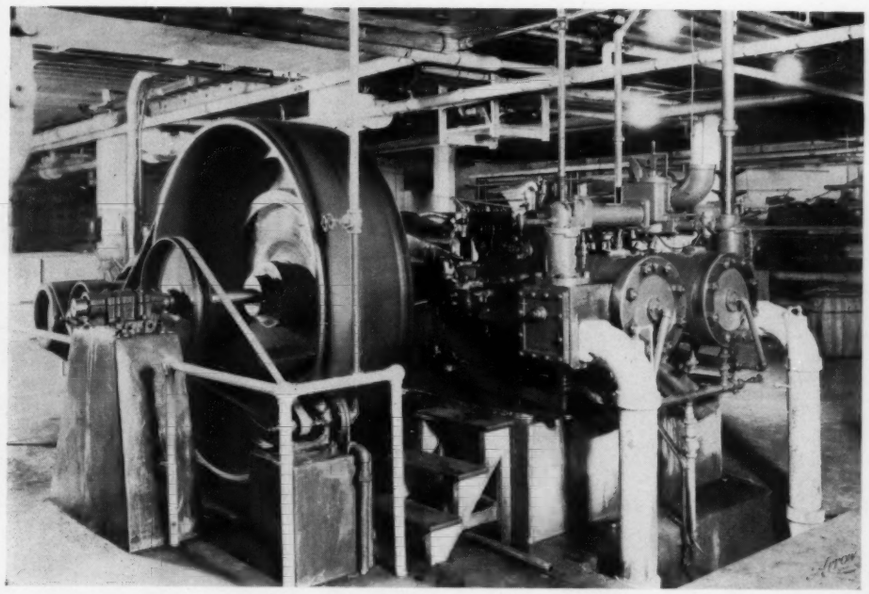
Central Public Service Corp., reports that merchandise sales for the 11 months of 1930 ending November 30 totalled $4,259,502, as compared with $4,008,124 during the corresponding period of 1929, or a gain of 6.2 per cent.

Line to Serve Power Plant at Victoria

The Utilities Fuel Supply Co. of Dallas, Texas, has completed a 45-mile line from the Refugio Field to the steam turbine plant of the Central Power & Light Co., at Victoria, Texas.

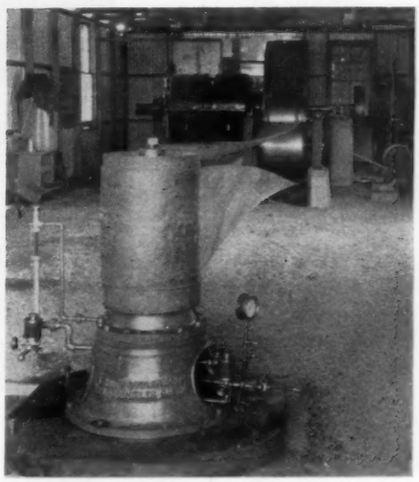
Installing Distribution Mains

Iowa Railway & Light Corp. is installing its natural gas distribution system in Toledo, Iowa, and has been granted an extension of time for its completion.



AT LEFT: A 160-H.P. gas engine plant operating at the Peerless Laundry, Los Angeles, Calif.

BELOW: A typical agricultural pumping installation on the Southern Counties Gas Co. system, showing a 160-H.P. gas engine, with combination automatic belt tightener and ball bearing idler.



The Gas Engine as a Load Builder

(Continued from Page 26)

Some interesting estimates on load factor for various classifications of engine use are given by the company, as follows:

Daily load factor for irrigation use—approximately 100 per cent. Annual load factor for this use would run between 50 and 60 per cent.

For ice and refrigeration applications the daily load factor is 90 to 100 per cent, and the annual load factor 60 to 75 per cent.

Electricity presents the stiffest competition, with rates as low as 8 to 9 mills per Kw. hr. and averaging 1 to 1.2 cents.

As indicating the economies to be gained through gas engine use, the company offers the following example:

Comparison of Operation of Mutual Water Company Plant Converted to Gas Engines

ELECTRIC OPERATION

H.P. installed	800
Kw. hrs. used	2,400,000
Cost	$24,550
Average rate per Kw. hr.	$0.01025
Cost per hour inch (miners inch)	1.78c

GAS ENGINE OPERATION

H. P. Installed	920
M.c.f. gas used	28,800
Cost	$7,231.00
Av. rate per M. cu. ft.	25.108c
Cost per hour inch	.524c

Mr. C. Remschel, power engineer for the Southern Counties Gas Co., will have detailed information to offer, from the standpoint of selling the gas engine load, in one of the installments in this series of articles, to appear in an early issue. How to arrive at a true comparison of power costs will be treated in this feature.

Something of the successful service experience of Southern Counties Gas Co. with the gas engine is indicated in the fact that rates to this class of user have decreased on an average of 2 per cent per year in the 10-year period 1920-1923. A saving estimated at $377,077 was effected over electricity in the company's territory through gas engine use in the one year of 1925 alone.

Many gas installations, both irrigation and industrial, will run in excess of 1,000 h.p. each.

Both the Community Natural Gas Co., and the Municipal Gas Co., headquartered in Dallas, Texas, and serving many communities in that state and Oklahoma, have made beginnings with the gas engine load, and anticipate extending effort in this direction. Treating these companies together, their combined sales to engine users total about 162,400 M.c.f. annually, bringing annual revenue of nearly $50,000. Their installations aggregate 5,130 h.p. Engine customers are served at rates averaging for the two companies about 32 cents per M.c.f.

While their engine load is in its early pioneer stage, these companies have already placed a considerable variety of users in service. These include such industries as cotton gins, grain mills and elevators, and cotton oil mills, showing adaptation to industrial needs of that area.

West Texas is one of the regions where irrigation pumping needs are to be met, with plentiful natural gas available for the purpose. It is understood that gas utilities of this section are laying plans to secure this load particularly in irrigated farms of the Winter Garden district, where agricultural development has progressed at a rapid rate in recent years.

Cities Service Gas Co., Bartlesville, Okla., has some progress to report with gas engine sales development, though much of this operator's load is in the oil fields. Zinc and lead mining industries on the company's lines are heavy users of gas engine power, at rates running in the neighborhood of 27 cents per M.c.f.

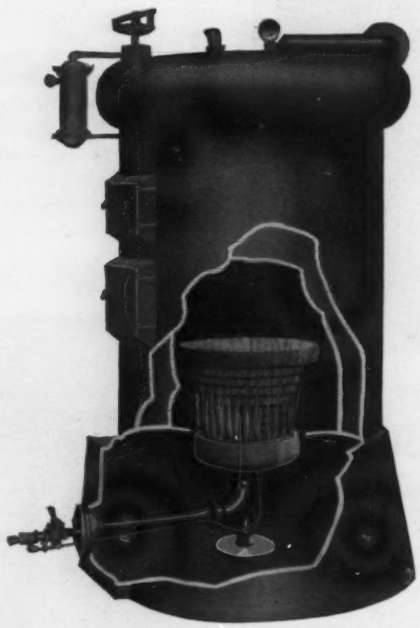
There are many companies in the West which have a few engine users, insufficient to constitute an important revenue factor. These customers in all liklihood have been put on the lines as a convenience, rather than through a determined program of building engine sales. However, there are certain signs pointing in the direction of more sales promotion for this form of gas consumption. Several companies, one or two of them among the larger western operators, have the engine load definitely budgeted into their program for 1931 development, and others are in the "interested" class.

This gas engine revenue is not to be laid at the door of the gas industry, to be picked up at no cost in sales effort. It is a technical job of salesmanship, calling for a high order of sales and engineering knowledge. But the initial fact to appreciate is that the economics are all in favor of gas. From there on the problem is one of selling—which the gas industry is demonstrating in other avenues that it can do to perfection.

To briefly summarize the competitive power field in which the industry must sell the gas engine the facts in Table No. 1 on electricity, gasoline and kerosene engines, steam engines, oil engines and gas engines, are presented, on the basis of cost to deliver 100 h.p., 10 hours per day for an average year of 300 days. That the gas engine

MAXON

DOMESTIC CONVERSION GAS BURNER



Now Available Completely Equipped with Automatic Control

Sturdy and Simple Yet Attains Complete Combustion

THE ULTIMATE IN

SIMPLICITY

Telegraph or write for prices, capacities, publicity material to

THE MAXON PREMIX BURNER COMPANY

MUNCIE, INDIANA, U. S. A.

The BARTLETT HAYWARD CO.

Designers and Builders

GAS HOLDERS

COMPLETE COAL GAS, CARBURETTED WATER AND BY-PRODUCT PLANTS

SALT WATER and FRESH WATER CONDENSERS

PURIFIERS, STEEL TANKS, FELD VERTICAL SCRUBBERS

Main Office and Works Baltimore, Md.

Lincoln Building New York City

stands out preeminently as the economical unit to install will be evident from a comparison of the costs shown.

Table No. 1

Fuel Cost for 100 H. P.—10 Hours per Day for 300 Days—(Average Year)

Electric Motor—90% Motor Efficiency:	
at 3c per KW	$7,500
at 2c per KW	5,000
at 1.2c per KW	3,000
Gasoline Engine—18c gasoline at rate of .1 gallon per H. P. hour	5,400
Kerosene Engine—9c kerosene at rate of .1 gallon per H. P. hour	2,700
Simple Steam Engine 9 lbs. coal at $4 per ton per H.P. hour	5,400
Modern Steam Engine—with all economizers 3 lbs. coal at $4 per ton per H.P. hour	1,800
Modern Steam Engine with all economizers using 40 c.f. of 20c natural gas per H.P hour	2,400
Semi-Diesel Oil Engine .6 lbs. fuel oil at 6c gal. per H.P. hr.	1,385
Diesel Oil Engine .48 lbs. fuel oil at 6c gal. per H.P. hr.	1,015
Natural Gas Engine—Using 10 c.f. gas per H. P. hour	
40c gas	1,200
30c gas	900
20c gas	600

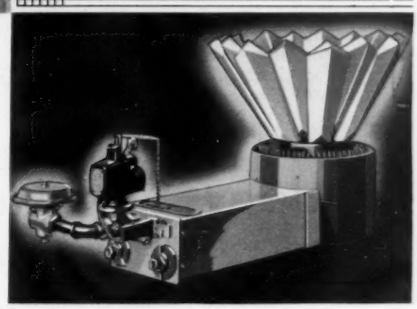
It will be recognized that the conditions of competitive costs assumed above are in line with existing price levels, and not set arbitrarily to favor the gas engine. In the above cost set-up the Diesel engine is the only competitive power unit approaching gas for operating cost economy. It is not the function of this article to present detailed facts demonstrating the superiority of gas engine over Diesel power, on a cost basis. Later installments will provide this proof, but suffice it to say here that excessive repairs, depreciation on higher first cost of installation, and such items as lubrication cost, effectually place Diesel power out of the running with gas engines. Natural gas is already a combustible fuel, causes fewer utilization problems, the gas engine requires less attendance—and the tale of advantages could go an at length.

Gas engines have won their way in southern California against cheap electricity and the sternest sort of electrical sales competition. They should find a clear road in many areas of the Middle West and other sections where electric rates average 2 to 3 cents per kw. hr., due to scattered power consuming centers and heavy electric transmission costs. Under such conditions gas engines may offer a six time cost saving over electricity.

Original installation cost, even when contrasted with the comparatively light investment in an electric motor, presents no obstacle when paid for out of operating savings. Gas engine manufacturers in many cases are prepared to install their units on this basis—no down payment and installment payments to be made out of savings from present power costs. This is mentioned as the strongest possible indication that operating savings on gas are real rather than imaginary.

When gas companies get the right perspective on the gas engine load the only remaining problem will be to establish the proper organization and lay the right groundwork to handle the necessary sales job. Gas engine manufacturers have always been prepared to work with companies interested in expanding their engine load, but these have been so few as to warrant little promotional work on the part of the manufacturer. This condition, however, is changing, and with his eye on the constantly widening field of

Your prospects will welcome JANITROL



Dollars are being spent for fuel .... Why Not For Gas ?

RIGHT NOW is the time to sell JANITROL. Home owners are disgusted with the inconveniences and shortcomings of other fuels . . . they are in a receptive frame of mind. They'll welcome JANITROL and the many comforts and advantages he brings. They'll welcome FACTS on gas for home heating.

Gas Companies are selling JANITROL NOW. Every JANITROL you install means greater domestic gas load . . . consumer satisfaction . . . good will.

Complete merchandising and advertising material (localized to fit your particular needs) will help you sell. Put JANITROL over with a bang this winter!

Give JANITROL an opportunity and he'll sell his own way into your prospects' homes!

Consider these JANITROL Facts:

1. **JANITROL is the greatest domestic load building appliance.**
2. **JANITROL is the lowest priced, fully automatic, quality burner.**
3. **JANITROL paves the way for future sales of complete gas fired equipment.**
4. **JANITROL comes completely assembled . . . easy to install.**
5. **JANITROL is backed by an efficient sales and service organization constantly at your command.**

JANITROL

Subsidiary of Henry L. Doherty & Company

Surface Combustion

Surface Combustion Corporation, Toledo, Ohio — Sales & Engineering Service in Principal Cities

natural gas transmission the manufacturer is now prepared to extend cooperation to any utility wishing to enter the field. A number of dependable gas engine units are available in a range of sizes. The industry must work rapidly toward the same degree of mutual cooperation between distributing companies and manufacturers that now exists in the appliance and the industrial field. Results cannot fail to follow in quick order.

Some of the steps which the gas company approaching engine sales must take are set forth in brief form below, leaving it to future installments in the series of articles which will be run in this journal, to elaborate upon ways and means.

The Set-up

The company must be prepared to make necessary investment in service facilities—main extensions into agricultural territory, where irrigation load is contemplated; industrial service lines in metropolitan areas. This step is of course a routine one, involved in any program of company expansion.

A primary step is that of drafting favorable rate schedules. Competitive power costs will govern rates to some degree, with the usual investment and service cost considerations added. Lack of proper rate set-up has retarded the load in some companies which have manifested interest in engine business.

The company must be prepared to supplement its sales staff or develop in its present sales staff specialized power engineers who will concentrate on engine sales, with a full knowledge of the gas engine and what it will do, and of competing equipment and fuels.

A general campaign of education throughout company organizations must be conducted, comparable to the campaign which has gradually sold the industry to house-heating, and to refrigeration; and which is now convincing the industry that house cooling by gas is a practical field of use for our product. To use a much-worn phrase, the industry must become gas engine "minded" before it will go after this field of service with determination.

Along with the sales organization must be built a service organization. This does not imply a complicated personnel, but a skeleton service staff to keep engine users satisfied with their installations by regular inspection and timely adjustments and repairs —which any form of prime mover demands. Many companies follow this practice with complete success in their industrial departments.

Manufacturer cooperation must be effected, as noted above, but this will follow without delay when the industry manifests its interest in the gas engine.

The engine load must be viewed as a long time promotion—not an over-night job of selling. When the industry accepts it in this light, and lays its plans accordingly, the load will grow to its potential status as a splendid revenue producer in a wide field of good load factor business, and the consumer will benefit to a marked degree in power cost economy.

Adding 1494 Heating Customers

(Continued from Page 29)

most interesting data we had had in the office for some time, as it showed our operating departments in their own technical jargon, what a campaign of this type really accomplishes in the way of additional load. Although our figures were not too accurate, we were able, by making ample allowance for error, to estimate that we had added at least 400,000,000 cubic feet annual load to our lines during the campaign.

Analyzing our sales of equipment, we were surprised to find the number of large heating customers included on the list. We had in mind that we would get a percentage of customers who had not been attractive enough, previous to this time, to our sales force, because of the small amount of merchandise they required, to become heating customers. Our figures show 76 gas boiler hot water conversions; 25 warm air furnaces; 447 warm air conversions, and 628 large circulating heaters. The remainder were smaller installations. For instance, in the Rapid City division, 18 "Radiantfires" were sold to heat tourist cabins, which were taken over by the county as poor house accommodations for the winter. All of these were placed on one meter, and the salesman got credit for only one new heating customer. All in all, we feel that adding 1494 heating customers to our lines during October and November, when our total meter installations did not read more than 10,000, is a record, and we are proud of our sales organization who turned the trick.

Review of the Month

(Continued from Page 23)

Completion was expected in late January or early February on the Panhandle Eastern Pipe Line Co.'s main trunk from Texas fields to the Mississippi at the Missouri-Kansas boundary—667 miles of 24-inch pipe, chief unit in the company's program for linking Texas areas to the Indiana distribution system of the Missouri-Kansas Pipe Line Co. with service to other centers enroute. The company announces present work beginning on some 25 laterals in Missouri and Kansas.

In the Pacific Gas and Electric Co's. 11 million dollar gas construction budget are two important line units newly announced last month—Milpitas to San Francisco (a second line), and Sacramento to Marysville—each involving about 2 million dollar expenditures. The company's Kettleman-Fresno and Fresno-Merced extensions will also build this year, as earlier outlined.

More California construction is assured in the definite organization of Southern Fuels Co., joining the interests of Southern California Gas Co. and Southern California Edison Co. in the 210-mile line from Kettleman Hills to Long Beach. Shaping of the construction set-up for this 26-inch carrier got under way last month with designation of company management personnel.

Another January development was the reported merger of Capital Gas Corp. with several other Montana utility interests, in the planning of a line from the Baker-Glendive structure, eastern Montana, to North Dakota points; thence to Winnipeg and other Canadian cities.

Idaho will shortly appear on natural gas maps, through drilling and gas line programs now in their early stages. Wasatch Gas Co. is taking its Utah system on to Pocatello. United Utilities Corp. proposes service for the western sections of Idaho on the basis of wells to be put down in eastern Oregon and western Idaho. Mountain States Oil & Gas Co., with gas production already developed in the Weiser district. is proposing service for Boise, and other cities of the western Idaho section.

Jerome L. Drumheller interests, which pioneered the Cut Bank gas area in Montana, continue to promote their Montana-Washington line undertaking, with permits asked this past month of Idaho and Washington utilities commissions to lay the carrier across these states to Spokane, bringing natural gas to Idaho points and other Washington centers. About 15 million dollars was given in reports as contemplated cost for the line as far as Spokane.

Earnings Showing for 1930

With due humility, many gas utilities announce 1930 earnings well ahead of the general industrial average—which was to be expected in another year of gas service expansion. Undoubtedly, industrial sales fell off in appreciable percentages but earnings levels held up surprisingly. The following figures are for a number of western companies which have recently given out 12-month earnings totals:

Company	1930	1929
Central Arizona Light & Power Co.	$1,456,380 (net)	$1,137,380
Arizona Edison Co.*	1,893,348 (gross)	1,750,972
Oklahoma Natural Gas Corp.*	4,421,814 (net)	4,552,111
Louisiana Power & Light Co.*	2,890,099 (net)	2,521,547
New Orleans Public Service Inc.*	6,301,309 (net)	5,856,457
San Diego Consolidated Gas and Electric Corp.*	3,695,080 (net)	3,502,959
Pacific Gas and Electric Co.**	34,950,207 (net)	33,573,104

*12 months ending November 30.
**12 months ending September 30, 1930, as compared to calendar year of 1929.

Domestic St. Louis May Get "Natural"

St. Louis, Mo., may have natural gas for domestic consumption, according to statements of Utilities Power & Light Corp. officials as reported in January. Laclede Gas Light Co., subsidiary of Utilities Power & Light, distributes manufactured gas in St. Louis, but industries of the city have natural gas available through the Mississippi River Fuel Corp's line from Louisiana fields.

Stock Dividend by Lone Star

Lone Star Gas Corp., headquartered at Dallas, Texas, has declared a stock dividend of one share of common stock for every seven shares held.

To Apply for Butane Franchises in California

According to an announcement made by the California Railroad Commission, as of January 22, the West Coast Gas and Fuel Co., San Francisco, Calif., has stated its intention of applying for franchises for the service of liquefied natural gas in Sonora, and Jamestown, Tuolumne County; San Andreas and Angels, Calaveras County; King City, Monterey County; Jackson and Sutter Creek, Amador County; Placerville and Diamond Springs, El Dorado County; Auburn and Newcastle, Placer County; Susanville, Lassen County; Alturas, Modoc County; Lakeport, Lake County.

The company has filed a petition asking the commission to issue an order declaring that public convenience and necessity require the exercise by the applicant of the franchise rights it contemplates obtaining for the service of liquefied natural gas of 1100 B.t.u. content in Brighton, Perkins, Mills, Natoma, Folsom, Ashland, Loomis, Rocklin, Penryn, Clarksville, Shingle Springs, El Dorado, Newcastle, Auburn, Diamond Springs and Placerville.

J. K. Firth Manager for Pacific Public Service

J. K. FIRTH, Jr., who was formerly head of the Fuel Oil and Asphalt Division of the Standard Oil Co. of California, has recently been appointed manager of sales for all Pacific Public Service properties. These include the Coast Counties Gas & Electric Co., The West Side Natural Gas Co., The Coast Industrial Gas Co., and the Natural Gas Properties, Inc.

J. K. Firth

Mr. Firth will have direct supervision of all sales activities of the properties named, both from the standpoint of the merchandising of appliances and the negotiating of new business.

The sales managements of the various individual subsidiaries concerned remain unchanged and will operate as heretofore under the various individuals who have been identified with them.

United Utilities Corp. Asks to Serve 12 Towns

Application for a certificate of public convenience and necessity has been filed by the United Utilities Corp., of Caldwell, Idaho, for permission to construct a natural gas transmission and distribution system for cities and towns in western Idaho, among them Boise, Caldwell, Meridian, Nampa, Emmett, Middleton, Parma, Star, Weiser, Eagle, Notus and Wilder.

The company announces its intention of carrying on a drilling program in the Pickle Butte area, near Caldwell.

Franchise Election Feb. 10

Centerview, Mo., will vote on a natural gas franchise on February 10. Central States Utilities Co. is the applicant.

New permanent building of the Oil Equipment and Engineering Exposition at Compton, Calif.

Oil Equipment Exposition in March

THE SECOND ANNUAL Oil Equipment and Engineering Exposition will be held from March 16 to 22 in the new permanent buildings recently completed at Compton, Calif., near Los Angeles, according to E. G. Lenzner, manager of the Exposition.

The main building is 180 feet by 400 feet, and is divided into 245 booths, which are all on one floor and under one roof. There are six main aisles with five cross aisles, the latter being continued beyond the building to the east to form the main aisles of the outside space. The entire area covered by the exposition is five acres in extent. The walls and flooring for the 80-foot by 40-foot extension to the main building have been completed. This will be used exclusively by the various societies as a meeting place. A screen will be provided for permanent use and a projector will be used during the March sessions.

A second extension of the main building will be 100 feet by 40 feet, and will be devoted to use as a restaurant, where meals will be served during the entire period of the Second Annual Exposition. Catering service will also be available to all organizations wishing to hold a dinner or banquet at the exposition grounds.

On the outside drilling rigs will actually "make hole." The first location has already been made and the derrick and rig for this will be in place some time before the Exposition is opened.

The exposition is located in the heart of the Los Angeles Basin oil fields and is within a short distance of all other California fields. Trips through local fields are being arranged so that visitors from outside the state will be given an opportunity to inspect methods being employed in California. These trips will be free, as will admission at all times to the exposition, to those connected with the oil industry.

The present schedule of meetings to be held in Los Angeles during the time of the Exposition are as follows:

March 17—American Welding Society.

March 18—American Institute of Mining and Metallurgical Engineers.

March 19—American Society for Steel Treating. (Tentative date.)

March 19—California Natural Gasoline Association.

March 20—American Petroleum Institute, Division of Production.

March 20—Southern California Meter Association.

All of the above meetings will be held at the exposition grounds except those of the California Natural Gasoline Association and the American Petroleum Institute. Several other societies will also hold meetings during the Exposition, dates to be announced later.

Dinner Ends Sales Year for So. Co.'s Gas Co.

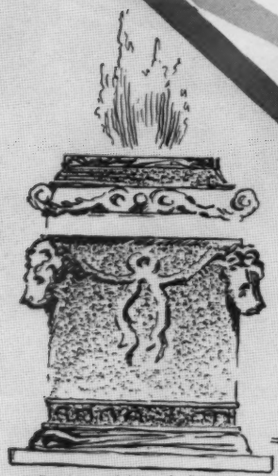
Southern Counties Gas Co., concluding its merchandising year, held its Fifth Annual Jollification Sales Dinner at its general offices in Los Angeles, on Friday evening, January 16th, with over 100 guests present. Clyde H. Potter, commercial manager for the company, was in charge.

President F. S. Wade, other company district and headquarters executives, and a number of invited guests were present with the company sales staff. James Foley, well known humorist, gave a feature talk on the evening program. W. D. Thurber, advertising manager; C. E. Rutledge, district manager for Orange County, and O. R. C. Grow, district manager for San Pedro, were among the speakers.

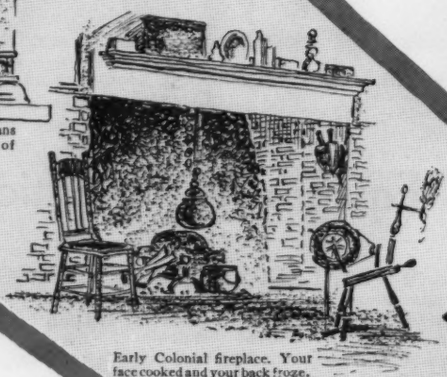
A competitive sales quota race is run among the eight districts of the company divided into two teams, each year. Losers in the race ate bologna at the sales dinner, while staffs of the winning four districts regaled themselves on roast duck.

Presentation of the "F. S. Wade Merchandising Trophy" by President Wade, to the Pomona District was a highlight of the evening.

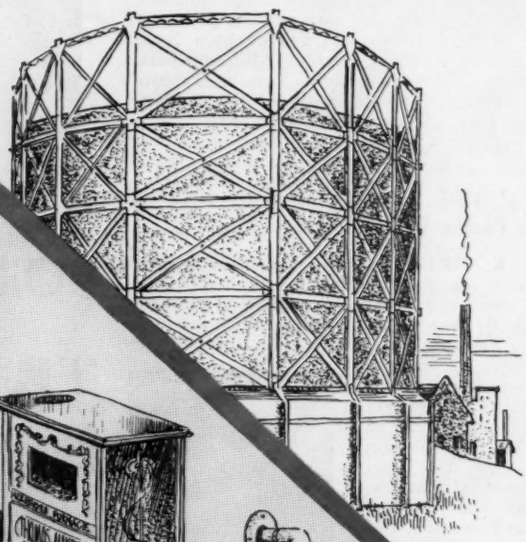
The DAWN OF A



Brazier used by early Romans and Greeks. Earliest method of home heating.



Early Colonial fireplace. Your face cooked and your back froze.



In 1767 the first American stove was invented by Thomas Maybury.

Round type of stove used for burning coal and wood. Messy and inefficient.

burn GAS There's no FUEL like it!

This is the symbol of the modern era of home heating. Use it all the time. Gladly will we furnish electrotypes of this symbol for the use of the gas company, in any needed size.

NEW ERA IN HOME HEATING

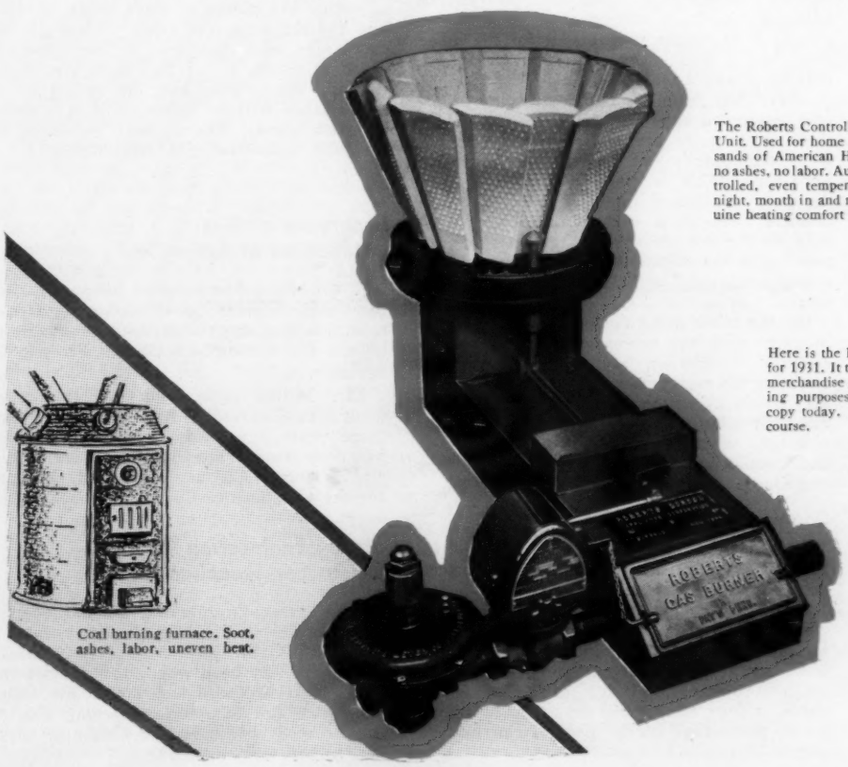
And with this New Era comes Greater Gas Revenue

IT'S a far cry from the ancient days of house heating by means of the early Roman Brazier, to the ultra modern method of home heating by gas the Roberts way. But this modern method didn't come over night. It is the result of a process of evolution extending back over a period of thousands of years.

A new era of labor saving, and health advancement is dawning in the American home. All over the nation, today thousands of homes are experiencing the ease and luxury of gas home heating the Roberts way. And with this new era greater opportunities than ever are opening to the gas company for increased gas revenue.

Is your company keeping step with this march of progress? Are you making the most of the Gas Age opportunity? Are you energetically advancing the cause of home heating by gas in your community? Let Roberts help you. Send for the new Roberts Book for 1931. In it are shown complete plans for taking advantage of the big opportunities gas heating offers. No obligation, of course.

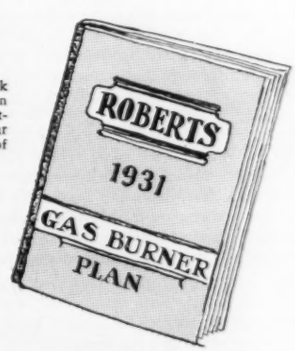
ROBERTS-GORDON APPLIANCE CORPORATION
DELAWARE AVENUE AT TUPPER STREET
CURTISS BUILDING BUFFALO, N. Y.



The Roberts Controlled Gas Heating Unit. Used for home heating in thousands of American Homes. No soot, no ashes, no labor. Automatically controlled, even temperatures day and night, month in and month out. Genuine heating comfort and luxury.

Coal burning furnace. Soot, ashes, labor, uneven heat.

Here is the Roberts plan book for 1931. It tells how you can merchandise gas for home heating purposes. Send for your copy today. No obligation, of course.



ROBERTS
CONTROLLED
GAS HEATING UNIT

Advertising Gas to Industry

(Continued from Page 35)

by reputable journals and published solely on their news value. We pay nothing for having them printed, neither do we pledge ourselves directly or indirectly to reciprocate by buying advertising space in such journals. The stories must stand or fall entirely on their own merits as "news" items of interest and instruction to the readers of the journal. There is no collusion between the "publicity" activity and the "advertising" end. Editors may take them or leave them, just as they please. Last year 72 original articles were written, and 52 magazines printed 70 stories. This demonstrates that a large number of trade journal editors are alive to the fact that industrial gas stories, new uses, new installations, and new developments, are items of first class interest to their readers, and they are glad to get them. Gas as an industrial fuel has arrived—but it is still new enough to make it a matter of interest and importance to the manufacturer.

This $75,000 campaign, which I have outlined, is confined to the trade journal field, and is all that is being done at the present in the way of national advertising. I hope to see the day when the American Gas Association will deem it wise to allow their advertisements to appear in national mediums of large and general circulation, such as Time, the Literary Digest, Nation's Business, and similar publications, that for the most part are read with as much interest by the manufacturer, the engineer, and what Time calls the "tycoons"—as they devote to their individual trade journals.

Outside of this national campaign, individual companies can do all the local advertising for industrial gas that they desire to do, and use any form of advertising they prefer for the purpose.

We have the daily newspapers, radio, direct-by-mail, and outdoor advertising billboards.

In a city of from a million to five million people, with comparatively few potential buyers of gas for industrial purposes, we are confronted with two problems; how best to reach these few; and more particularly still how best to impress them with the magnitude and importance of our proposition. For this purpose I consider daily newspapers out of the question entirely. Space in metropolitan newspapers is very expensive, and the life of the daily edition is very short—born at 8 A.M. and dead by 11 A.M.

For immediate sales, newspapers are perhaps the best medium we have, but industrial gas is not an "immediate sales" proposition. People do not buy industrial gas like they buy druggist's sundries, or even gas ranges.

The question has been put up to me several times: "Why do we advertise at all?"—on the line of reasoning that our prospects are comparatively few, and the job will have to be sold by an engineer-salesman who can visit every prospect at much less expense than an effective advertising campaign will cost.

My answer to that is to quote a remark made by Mr. Samuel Insull on the same subject—"to create an atmosphere." I think this reply conveys its meaning without much examination or analysis. When a man is using some crude fuel in his factory and finds industrial gas advertising in his trade journal—when he gets a few pieces of industrial gas advertising in his morning mail, and when in his daily journeys around the city he beholds illuminated billboards calling attention to the fact that "gas is a factory fuel," he is much more likely to be sympathetic to the subject when the salesman makes his call, than if he had never heard or seen the matter mentioned anywhere before. The advertising has built up the image in the mind of the prospect.

When you call to sell a man something on a direct appeal he unconsciously assumes a sales-resisting attitude, adopts a sort of defensive armor. But when you go out into the highways, and the buy-ways, and announce your product to the world at large, your prospect is not on the defensive, he does not feel that your argument is directed against him, but the information soaks in between the joints of his harness. Ultimately his whole exterior is softened and he is already more or less warmed up to your proposition by the time you get around to present it to him on a purely personal basis.

A good deal of effort and quite a lot of money goes into the preparation of the American Gas Association trade journal advertisements. Proofs of these can be had from headquarters, at about what they cost to print, and they can be made very useful as mailing pieces to a list of your prospects. One or two good looking "proofs" in a man's mail once or twice a month will keep him alive to the fact that the gas man is "up and doing" and that things are stirring in the industrial gas fuel field.

One company, at least, has adopted the practice of having good photographs taken of installations they have made, and sending an actual photograph around to their prospects. This is an excellent idea also, but presents many problems, besides that of cost. Many manufacturers object to having their plants photographed, and it is a matter of considerable difficulty to get a photograph, even when permission is granted, that is entirely satisfactory from an advertising point of view. A collection of such photographs is of course very useful for the office files, but it is only exceptionally good ones that have any advertising value.

There has been so much silly salesmanship attempted over the radio in practically all lines that its usefulness, in my opinion, has, temporarily at least, been greatly impaired. This is particularly true when the copy is turned over to a regular announcer, who is a sort of academic robot with an Oxford accent; teacher's pet demonstrating to the class how to read aloud, with a well modulated voice, careful of diacritical marks.

On the other hand there are people in the industry with the necessary information, the essential conviction, and the correct tonal qualities necessary for radio talks—who, if they avoid using too many technicalities and are not too long winded could make an excellent talk on the subject of gas service, and incidentally stress its new uses, in industry and house heating.

Outdoor Advertising

I do not know of any better way of informing a community of a fact, than by putting that fact on an illuminated bill-board. It is also the cheapest way. The monthly cost of a billboard, working for you 18 hours a day, every day in the month would only buy a very small amount of space in a daily newspaper, giving you a flash for three or four hours, and that seen by only a small percentage of the people who buy the paper.

A boulevard board, well designed and well lighted is an extension of the shop window, and most people enjoy looking at shop windows. Billboards on a railroad right-of-way can be rented for as small a sum as $35 a month. About 18 months ago the A.G.A. Industrial Gas Section Advertising Committee made an attempt to interest gas companies in putting at least one railroad billboard in their territory.

You can imagine the impression that would be made on a transcontinental traveller if he saw a billboard in every town and city he went through, announcing the fact that manufacturers of that town used gas in their fabrications. He could hardly escape the conviction that gas was rapidly becoming the universally accepted fuel for all factory purposes, as indeed it will be in a very short space of time.

Unfortunately, only a few companies adopted this suggestion, although a good many companies, all over the country, and particularly in the West, expressed interest in the idea.

I believe in the course of the next few years we will see an extension of gas mains throughout the country that will make gas service as commonly available as railroad service is today.

With the knowledge that gas in enormous quantities will soon be available to us in the Middle West, comes also the fact that competition in the factory fuel field is keener than it ever was before. Those interested in liquefied gases, and electricity are making tremendous efforts to capture as much of the industrial trade as they can get. The coal men have performed miracles in furnace construction, eliminating many of the hitherto inherent objections to solid fuel, and making it possible to use the poorest and cheapest grades of coal, with advantage and economy.

Then there is the continued failure of many combination gas and electric companies to aggressively develop the gas business on a parity with the efforts they put into developing the electric business.

There is no doubt that the industrial gas salesman has plenty of hard work ahead of him for the next few years. That gas will eventually win there can be no reasonable cause to doubt, and I feel sure that it will win all the sooner, and the industrial gas man's labor will be lightened if it is backed up with steady, liberal, and persistent line of good industrial gas advertising.

Supervisor of Gas Installations at Springfield

R. G. Miller has resigned his position with the Public Service Co. of Colorado, Denver, to accept a post as supervisor of gas installations for Springfield Gas & Electric Co., Springfield, Mo.

Mr. Miller supervised the change-over from manufactured to natural gas in Denver three years ago, and during the past year has done similar work for the Federal Light and Traction Co. at Springfield, Mo., and for the Gas Service Co. at Sedalia, Mo.

Stacey Engineering Co. Opens San Francisco Office

The Stacey Engineering Co. has opened a branch office at 235 Montgomery Street, San Francisco, Calif., in charge of E. A. McCallum, who has been appointed district manager. Mr. McCallum, prior to his association with the Stacey Engineering Co., was on the staff of the Pacific Gas and Electric Co. as assistant engineer.

Merits of Soil Corrosion Survey Work

part constructed in accordance with the soil corrosion survey specifications. It must therefore be true that such differences, as will be shown to exist between the soil corrosion survey specifications and actual construction, would inevitably have been considerably greater if the soil corrosion survey had been omitted or entirely disregarded.

Of the 528 opinions concerning conditions at specific points, 49.6 per cent call for heavy protection, 40.7 per cent for light protection, and the balance, 9.7 per cent considered protection unnecessary. Table No 1 shows, for each group of opinions, the extent of agreement between the degree of protection required (as indicated by the opinions) and the degree of protection actually used or as specified as a result of the soil corrosion survey.

It will be noted that, where inspection demonstrated the desirability of heavy protection the soil corrosion survey prior to construction indicated the correct degree of protection in approximately 90 per cent of the cases. Mere surface observation, the basis for at least part of the actual use of protection, gave the correct result in only about 75 per cent of the cases.

The difference between the results obtained by a detailed study of soil conditions and by what amounts to hardly more than guesswork is more apparent where actual corrosion conditions are less severe, indicating the necessity of light protection. In this group, the soil corrosion survey dictated the specifications of light protection in about 60 per cent of the cases, and of heavy protection in an additional 36 per cent. To follow the results of the soil corrosion survey was apparently safe or conservative in over 96 per cent of the cases. Simple surface observation, on the other hand, called for light protection in 39 per cent and heavy protection in only 13 per cent of the cases. A protection program based on the older method, therefore, would appear to be safe or conservative in a total of only 52 per cent and actually inadequate and unsafe in nearly half of the decisions made.

The Amarillo-Denver line, as constructed, was without protection at over 48 per cent of the inspection points where corrosion conditions, as determined by inspection, required light protection. In the 51 cases where no protection appeared to be necessary, the line as actually constructed has no protection in 92 per cent. Simple surface observation led to conservatism, expressed in the use of pipe protection where none was required, in only 8 per cent. The soil corrosion survey, however, called for 68 per cent light protection.

If a similar study of these data is made from a slightly different viewpoint, Table No. 2 results.

In the tabulation, the independent opinion of eight persons as to the degree of protection required, has been compared with the degree of protection specified as a result of soil corrosion survey and with the degree of protection actually applied, which was, in part at least, based solely on surface observation.

The table shows not only the total number of changes from decisions made prior to construction indicated by inspection after service as desirable, but also the total possible changes in each class. For example, where the change indicated is the increase of protection, such a change is not possible where

(*Continued from Page 32*)

heavy protection was originally specified or applied. Because the protection applied differed from that specified as a result of the soil corrosion survey, the expression of changes indicated as percentages of changes possible will afford more comparable figures for detailed consideration.

Whereas Table No. 1 demonstrates the greater conservatism of the soil corrosion survey, Table No. 2 shows its closer agreement with actual requirement. Although the opinions as to the degree of protection actually required agree with the soil corrosion survey in 72 per cent of the total possible cases, there is only a 62 per cent agreement with the protection used in the construction of the line. Where the actual degree of protection required differed from that indicated by the soil corrosion survey, in 112 out of a total of 148 instances the protection shown by inspection to be required is less than originally specified. In comparing the degree of protection actually used with that found to be necessary, in 170 out of a total of 202 cases the line was laid with too little protection. It is also interesting to note that no case was found in which the soil corrosion survey caused the specification of no coating where heavy protection was required, although in 17 cases bare pipe was laid when the best available protection should have been used.

It is sometimes contended that no distinction between heavy and light protection is permissible; that a pipe protection is either satisfactory or worthless; that a pipe line should be considered either as being protected or as being laid bare. On this basis, Table No. 2 has been recomputed and changed to Table No. 3, where differences similar to those commented upon above are even more apparent. It is perhaps sufficient to note here that opinion confirms the results of the soil corrosion survey in practically 92 per cent of the cases and agrees with the construction program in only slightly over 76 per cent, although construction in its early stages was in accordance with the survey specifications. Where disagreement exists with the result of the soil corrosion survey in only 8 out of 43 cases should more protection have been specified. Where disagreement exists in the case of the construction program, in 121 out of 125 cases pipe which should have received protection was actually laid bare.

It is thoroughly appreciated that inspections at 66 points should not be taken as presenting a complete and accurate picture of 340 miles of right of way. Nevertheless the distribution of the degrees of protection required at these points into the three classes considered throughout this paper may be taken as an approximately correct distribution for the line as a whole, at least for purposes of developing a rough comparison of costs and potential savings.

In the construction of the Amarillo-Denver line, the average overall cost of applying heavy protection was about $0.35 per foot or $1,848 per mile, including material, labor and supervision. Calculated in a similar manner, light protection cost approximately $0.15 per foot or $792 per mile.

Table No. 4 shows the percentage of total length with heavy protection, the percentage with light protection, the number of miles

TABLE NO. 1. COMPARISON OF DEGREE OF PROTECTION APPLIED AND OF SOIL CORROSION SURVEY SPECIFICATIONS WITH OPINIONS OF DEGREE OF PROTECTION REQUIRED BASED ON INSPECTION AFTER SERVICE

	Actual Application		Soil Corrosion Survey Specifications	
	No. of Cases	Per Cent	No. of Cases	Per Cent
Heavy Protection Required	262	100.0%	262	100.0%
Agreement	196	74.8	234	89.3
Light or no protection applied or specified	66	25.2	28	10.7
Light Protection Required	215	100.0	215	100.0
Agreement	83	38.6	130	60.5
Heavy protection applied or specified	28	13.0	77	35.8
No protection applied or specified	104	48.4	8	3.7
No Protection Required	51	100.0	51	100.0
Agreement	47	92.2	16	31.4
Protection applied or specified	4	7.8	35	68.6

TABLE NO. 2. COMPARISON OF OPINIONS, BASED ON INSPECTION AFTER SERVICE, OF PROTECTION REQUIRED WITH SOIL CORROSION SURVEY SPECIFICATIONS AND WITH DEGREE OF PROTECTION APPLIED

Change From Survey Specifications:	Changes Required by Opinions Based on Inspection						
	Increase Protection			Decrease Protection			
	1 Degree	2 Degrees	Total	1 Degree	2 Degrees	Total	No Change
Changes Required	36	0	36	111	1	112	380
Possible Changes	216	24	216	504	312	504	528
Per Cent of Total	68	0.0	6.8	21.0	0.2	21.2	72.0
Per Cent of Possible Changes	16.7	0.0	16.7	22.0	0.3	22.2	72.0
Actual Application:							
Changes Required	153	17	170	32	0	32	326
Possible Changes	304	168	304	360	224	360	528
Per Cent of Total	29.0	3.2	32.2	6.1	0.0	6.1	61.7
Per Cent of Possible Changes	50.3	10.1	55.9	8.9	0.0	8.9	61.7

TABLE NO. 3. COMPARISON OF OPINIONS, BASED ON INSPECTION AFTER SERVICE, OF REQUIREMENT OF PROTECTION, WITH SOIL CORROSION SURVEY SPECIFICATINS AND WITH PROTECTION AS APPLIED

Change From	Changes Required by Opinions Based On Inspection: Use Protection	Eliminate Protection	Protected	No Change: Bare	Total
Survey Specifications:					
Changes Required	8	35	469	16	485
Possible Changes	24	504	504	24	528
Per Cent of Total	1.5	6.6	88.8	3.1	91.9
Per Cent of Possible Changes	33.3	6.9	93.1	66.7	91.9
Actual Application:					
Changes Required	121	4	356	47	403
Possible Changes	168	360	360	168	528
Per Cent of Total	22.9	0.8	67.4	8.9	76.3
Per Cent of Possible Changes	72.0	1.1	98.9	28.0	76.3

TABLE NO. 4. VARIOUS ALLOCATIONS OF PROTECTION BY PERCENTAGES AND BY MILES, WITH ESTIMATED APPROXIMATE TOTAL COSTS

Basis of Allocation	Degree of Protection: Heavy	Light	None	Total
As Constructed:				
Miles	123.4	97.6	119.0	340.0
Per Cent of Total	36.3	28.7	35.0	100.0
Estimated Cost	$228,040	$77,300	....	$305,340
As Specified by Survey:				
Miles	171.7	143.8	24.5	340.0
Per Cent of Total	50.5	42.3	7.2	100.0
Estimated Cost	$317,300	$113,890	....	$431,190
As Required (A.G.A. Inspection):				
Miles	157.8	145.2	37.0	340.0
Per Cent of Total	46.4	42.7	10.9	100.0
Estimated Cost	$291,610	$115,000	....	$406,610

TABLE NO. 5. COMPARISON OF SAVINGS RESULTING FROM VARIOUS PROTECTION PROGRAMS

	Estimated Total Saving	Per Cent of Justified Saving
Saving justified by A.G.A. inspection after service	$221,710	100.0%
Saving provided for by soil corrosion survey specifications	197,130	88.9%
Saving realized as constructed	322,980	145.7%

coated with each of these two grades and the number of miles laid bare; also the approximate cost of protection using the unit costs just cited. These figures are given for the line as constructed, as they would have been if construction had been governed by the soil corrosion survey specifications, and as they should have been according to the American Gas Association inspections.

In the absence of some kind of investigation and study and with knowledge of the relatively active corrosiveness of land similar to the projected right of way, the proper procedure would have been to use heavy protection throughout. For this the cost may be estimated at $628,320 Using this figure as a basis, Table No. 5 considers the excess over $406,610 as the total justifiable saving in the protection of this line and compares the savings under other protection programs.

By strict adherence to the soil corrosion survey specifications nearly 90 per cent of the justifiable saving would have been realized, the remaining 10 per cent representing the cost of conservatism. By the actual construction program a saving was realized amounting to nearly 46 per cent more than can be justified by information now at hand and, by the amount of the excess representing no true saving but a deferred expense which can only partly cover the costs of early reconditioning and repairs.

Appliance Society Research Bureau

UNDER the leadership of A. L. Crane, managing director of the Gas Appliance Society, a domestic research bureau of that Society has been formed which has for its purpose the dissemination of gas information among architects, builders, building and loan companies and individual home builders.

The committee overseeing this activity is composed of C. B. Babcock, chairman, San Francisco manufacturers' representative; Frank Klimm, San Francisco plumbing contractor and president of the board of health; Frank Talcott, San Francisco division sales manager of the Pacific Gas and Electric Co.; and L. Cinq-Mars, gas furnace manufacturer and factory representative.

The objective of the Research Bureau is to insure in all houses constructed adequate outlets in every room for gas appliances. A weekly letter is being mailed out to 800 architects, realtors, builders and home owners covering various phases of ideal heating and piping requirements. The first letter, which was mailed Dec. 11, and the second one which followed it a week later, had to do with piping. The third and fourth covered flues and vents, and the fifth will point out the necessity of allowing sufficient wall space for adequate kitchen equipment.

Old Guard Annual Banquet

The 19th Old Guard Banquet of the Los Angeles Gas and Electric Corp., will be held in the Sala d' Oro of the Biltmore Hotel on February 4. Tom Parks, purchasing agent for the company, will act as toast master for the occasion. One hundred and forty-one employees are to be initiated into membership, bringing the total to 541. To be eligible an employee must serve with the company 10 years.

Officers, Montana Chapter Rocky Mountain Association

Officers elected to serve the Montana Chapter of the Rocky Mountain Oil and Gas Association during the coming year are:

President: L. F. Sonntag, president of the Triangle Oil & Gas Co., Great Falls, Mont.

Vice-president, Production Division: Lee J. Yealy, general production superintendent, Ohio Oil Co., Shelby, Mont.

Vice-president, Marketers Division: W. E. Rice, president, Rice-Radigan Oil Co., Great Falls, Mont.

Vice-president, Refining Division: James W. Johnson, vice-president Northwest Stellarene Co., Shelby, Mont.

Vice-president Natural Gas Division: E. B. Coolidge, president, Homestake Oil Co., Great Falls, Mont.

Vice-president, Royalty Division: O. I. DeSchon, editor, Montana Oil Journal, Great Falls, Mont.

Treasurer, R. P. Johnson, president Suntana Oil Co., Great Falls, Mont.

Secretary, Walter F. Brittan, president Bannatyne Pipe Line Co., Great Falls, Mont.

Southern California Gas Makes Steel Plant Installation

Southern California Gas Co., Los Angeles, recently completed a natural gas installation for Consolidated Steel Co., in its new Los Angeles plant covering 50 acres. The main supply lines, 6 inches in diameter, extend from the company's orifice meters to a loop system which reaches various parts of the plant. The system was planned by engineers of the gas company so than an additional loop may be added later if necessary. The loop is constructed with shut off valves so that certain sections of the plant lines may be shut down if desired without interfering with the rest of the system. It is estimated that the company, when in full operation, will use 20 million cubic feet of natural gas per month.

United Gas Company Completes Compressor Station

United Gas Co., Houston, Texas, recently completed a 3,000-H.P. compressor station at Goodrich, Texas. The new station will boost the gas from the northern and eastern Louisiana fields through Crosby to the pipe line loop serving Harrisburg, Baytown and other centers in that district. Construction of the plant called for a main building, an auxiliary power plant, machine shop and office. A cooling tower and after coolers have also been installed.

Franchise Granted in Louisiana

Louisiana Power & Light Co., headquartered at New Orleans, La., has acquired natural gas franchises in the towns of Ponchatoula, Independence, Amite, Covington and Slidell. The gas supply will come from the Bogalusa extension of the United Pipe Line Corp.'s line to Mobile, according to word received from McGregor Smith, vice-president and general manager of Louisiana Power & Light Co.

35,000,000 c.f. Gas Well

According to recent press dispatches a 35,000,000-cubic foot gas well was brought in recently in Moffat County, Colo. Pressure in the well is estimated at 1020 pounds.

A 50% SAVING in JOINTS

—with NATIONAL DOUBLE LENGTH PIPE

HERE IS another NATIONAL advantage that means a real worth while saving to gas companies—the use of NATIONAL Double Length Pipe for distributing mains. Double length pipe cuts the number of joints to about one-half . . . reduces leakage and means a considerable saving in time, labor and joint-making materials.

The increasing demand for NATIONAL Double Length Pipe by gas companies throughout the country shows a definite trend towards this feature of economy in pipe line construction. This "double length" advantage is, of course, backed by the usual NATIONAL qualities. The steel is of good welding quality and being uniform in chemical and physical properties, enables the welding crew to make uniformly strong joints. The steel has also a high degree of ductility—a characteristic that makes long lines flexible and easy to lay.

Remember, NATIONAL is the only lap-welded pipe made in double lengths—another reason why it is

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

NATIONAL PIPE

MONTANA GAS FIELDS*

Name of Field	No. of Wells	Average Daily Open Flow in Million Cu. Ft.	Pressure	Approx. Total Open Flow in Million Cu. Ft.	Depth
Baker-Glendive	96	1 to 28	210 430	400	800 and 1200
Shelby-Sunburst	58	1 to 20	380	225	1200 to 1500
Sweetgrass Hills	7	5	225 to 350	40	1000 to 2000
Cut Bank	4	5	900	20	2800
Bowes (Havre)	7	8	260	60	1000
Dry Creek (Red Lodge)	2	10	1400 2000	20	3000 4500
Lake Basin (Billings)	5	3	380	15	2800
Bowdoin-Saco	32	½–1½	300	50	800
Hardin	17	1/10	137	1	700
Elk Basin†					

*The gas from all Montana fields comes from formations of Cretaceous age.
†Undeveloped for gas.

Montana's Natural Gas Resources

(*Continued from Page 27*)

Some gas is produced from the Red Coulee and Pondera oil fields. It is marketed in the oil fields and in local towns.

Elk Basin and Dry Creek are outstanding fields near Red Lodge in the northern extension of the Big Horn Basin. Two wells drilled in Wyoming areas of the Elk Basin have a pressure exceeding 1000 pounds and daily open flows in excess of 50 million cubic feet each. A pipe line has been constructed from the Wyoming wells to Billings, Mont., where the gas is being marketed.

The new Dry Creek field 8 miles east of Red Lodge is the northernmost producing anticline in the Big Horn Basin. Each of the two wells drilled will produce about 10 million cubic feet of gas per day with a pressure of from 1500 to 2000 pounds. The field promises to furnish additional wells. The Billings pipe line has been connected with these wells.

Other Fields

In the Bowes structure 20 miles southeast of Havre 7 wells obtained a total of 40 million cubic feet of gas, with a pressure of 260 pounds. This field supplies the city of Havre with gas.

In the Bowdoin-Saco area nearly 30 wells have been drilled. Gas was obtained in quantities of from ½ to 1½ million cubic feet per well daily. The gas is piped to Malta, Glasgow and other nearby towns.

In the Lake Basin area five wells are producing gas in volumes from 3 to 5 million cubic feet each daily, and the pressure was originally 380 pounds. This gas is being used locally in the manufacture of carbon black.

At Hardin 17 wells produce 100,000 to 500,000 cubic feet daily, providing adequate supply for the town of Hardin.

A gas well producing about 5 million cubic feet daily has recently been completed on a small anticline on the north flank of the Judith Mountains near Lewistown, and plans have been made to pipe the gas to that city.

Available Gas Totals

The total available gas in Montana amounts to nearly 800 million cubic feet per day. Consumption within the state is much less than 50 million cubic feet daily, and the consumption by towns outside of the state is less than that within. A dozen or more towns and cities within the state, including Butte and Anaconda are still without natural gas. Montana is rapidly becoming enthusiastic about the installation of natural gas, and without question more pipe lines will be laid in the near future. It is not definitely known if the supply for Butte and Anaconda, the biggest market in the state, will come from the Big Horn Basin, or from the Sweetgrass Arch. The Big Horn Basin has almost enough gas developed, whereas many more wells will have to be drilled in the Arch region. In either case many believe that a pipe line will be started for Butte before the end of another year.

Public Utility Building

A public utility building is to be erected at Long Beach, Calif., at a cost of approximately $125,000, and will house the city gas, water and other municipal departments.

Coast Industrial to Supply Columbia Steel

The Standard Management & Operating Corp. has completed plans and is now installing a distribution system in the plant of the Columbia Steel Corp. at Pittsburg, Calif. Gas will be furnished by the Coast Industrial Gas Co. to this huge plant, which represents one of the biggest potential industrial gas loads on the Pacific Coast.

The distribution system involves over a mile of pipe, varying in size from 12-inch to 2-inch and is designed with a capacity to handle the complete heating requirements of the plant, annealing furnaces, tin pots, galvanizing furnaces, etc.

Various portions of the plant equipment will be converted from oil to gas, a few installations at one time. When and if the open hearths are converted to gas, there is said to be a possible maximum load of 20,000,000 cubic feet per day consumption in prospect.

Gas Sales in Upward Curve for Central Public Service Corp.

Central Public Service Corp., Chicago, Ill., reports that gas sales by the corporation's operating subsidiaries for the month of November showed an increase of 5.04 per cent over the previous November, and a 1.04 per cent gain was reported in gas sales for the 11 months of 1930, ending November 30, over a corresponding period in 1929.

The total sales of gas by the properties was 1,145,611,838 cubic feet in November as compared with 1,090,647,950 in 1929. For the 11 months ended with November, sales totaled 11,642,556,584 cubic feet compared with 11,522,404,220 the same period of 1929.

Calif. Oil & Gas Assn. Elects Its 1931 Officers

At a meeting of the board of directors of the California Oil and Gas Association held late in December, officers for the year 1930 were re-elected to serve during 1931.

Herbert R. Macmillan, vice-president of the Macmillan Petroleum Corp., continues as the association's president. C. S. Jones, vice-president of the Rio Grande Oil Co., and William Reinhardt, vice-president and production manager of the Shell Oil Co., continue as vice-presidents, and H. L. Westbrook, vice-president of the Belridge Oil Co., continues as treasurer.

Line to County Farm

The Grady County Farm, northwest of Chickasha, Okla., will be supplied with natural gas by the Southwestern Light & Power Co. A 2-inch high pressure line is being run from the city to the farm. In addition to the county farm several suburban homes will be served from the line.

Franchise Election at Mulhall

A special election will be held on February 4 at Mulhall, Okla., to decide on a 25-year franchise for the service of natural gas by the Mulhall Gas Co. Supply will come from the 20-inch line of the Cities Service Gas Co., approximately a mile away.

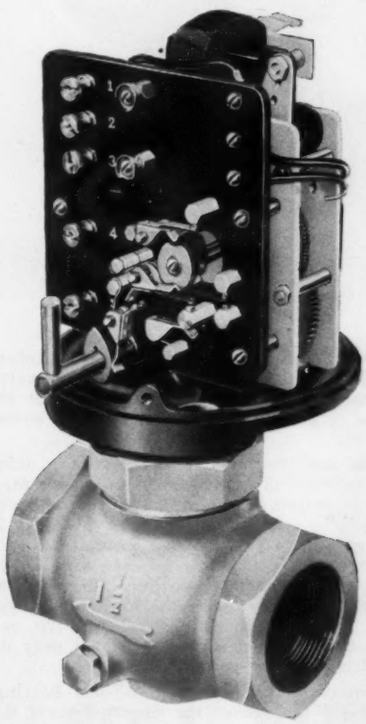
5,000,000 Cubic Foot Gasser

A 5 million cubic foot gas well was brought in during the past month 12 miles north of Mineral Wells, Texas.

TIME-O-STAT'S ELECTRIC GAS VALVE

THE No. 580 Electric Gas Valve is a motor operated valve . . . silent in operation . . . motor operates only on closing or opening of valve. Separate transformer furnished permits low voltage wiring for entire control system lowering installation costs. Consumes no power when closed and very little when open. Oil-less bearings and gears require no attention. The No. 580 closes automatically on power failure and has manual control feature. Design of valve eliminates overheating. Write in for full information.

The compact No. 580 valve—Valve sizes 1", 1¼", 1½", 2", 2½" and 3".



Interior view of No. 580 valve. This valve is available with secondary air damper control.

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EXCLUSIVE DISTRIBUTORS IN ALL PRINCIPAL CITIES OF THE UNITED STATES.
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Manufacturers of Automatic Controls for Oil Burners, Gas Burners, Coal Burners, Electrical Refrigerators, Furnace Fans, Mechanical Stokers, Industrial Ovens, Ice Machines, Unit Heaters, also of Sign Flashers, Mercury Switches, Electric Heaters, Corrugated Metal Bellows.

Canadian Utilities Under New Ownership

Frank T. Hulswit, president of the American Commonwealths Power Corp., announces that the company has completed the deal pending for some months whereby the gas and electric properties of the International Utilities Corp. in the Canadian Provinces of British Columbia, Alberta, and Saskatchewan are transferred to the first-named company's ownership, the newly acquired properties to be known as the Dominion Gas & Electric Co. Utilities affected by the purchase are Canadian Western Natural Gas, Light, Heat & Power Co., Ltd.; Edmonton Utilities Ltd.; Northwestern Utilities, Ltd.; Canadian Utilities, Ltd.; Union Power Co., Ltd.; Duncan Utilities, Ltd.; and Nanaimo Electric Light, Power and Heating Co. Ltd.

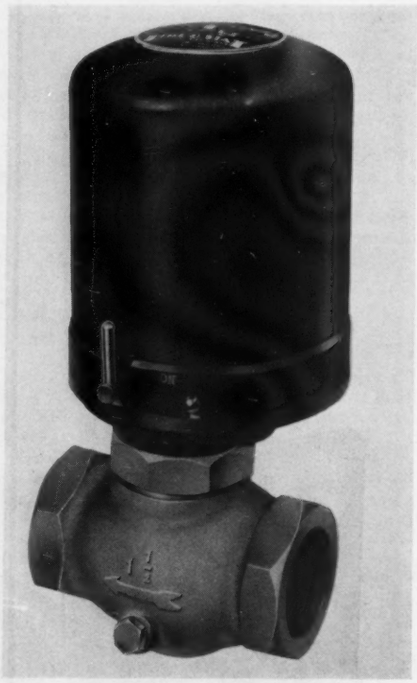
With the purchase, the Dominion Gas & Electric Co. will control 807 miles of gas transmission lines, with gas reserves of 175 billion cubic feet. The total estimated population being served by Dominion companies is 185,000. Gross earnings of these companies in the 12 months ended November 30, 1930, amounted to $4,505,942, and net earnings were $2,204,176. Approximately three-fourths of the gross income is derived from the sale of natural gas.

Supervision of the properties will be under Fred W. Seymour as president of Dominion Gas & Electric Co., while operations will continue under the management of C. J. Yorath, vice-president and general manager.

No. 580 Electric Gas Valve by Time-O-Stat

The Time-O-Stat Controls Co., Elkhart, Ind., announces a new electrically controlled gas valve for use on low pressure gas-fired equipment. The No. 580 Electric Gas Valve is adapted for use on industrial and domestic heating plants and various industrial processes where gas is the fuel. Boilers, furnaces, conversion burners, unit heaters and industrial ovens are a few of the applications for this valve. In conjunction with a low voltage room thermostat, it provides dependable and accurate control on all types of standard and domestic gas-fired equipment.

The operating mechanism of the No. 580 valve consists of a low voltage induction motor which operates through a train of gears to actuate a cam and roller action which in turn lifts the valve off the valve seat. A low voltage magnetic relay which maintains the valve in the open position is part of the construction. The relay is closed mechanically, but when de-energized permits the valve to drop instantaneously to the closed position, thus giving the quick closing



action. A manual control device, consisting of a lever operated cam which lifts the valve off the valve seat, is provided so that the valve may be operated in the event of power failure.

The new valve is equipped with a union nut between the valve body and the control case to permit the control case to be removed while the valve body is being installed in the gas line. The valve is provided with a ¼-inch pipe connection on each side of the body for the pilot supply line. The No. 580 electric gas valve is of the low voltage type and is furnished with a separate 20 volt transformer which can be mounted near the electrical supply outlet.

Non-corrosive parts and oil-less bearings are used throughout the construction of this instrument. The entire control mechanism is enclosed in a cylindrical cover.

The design of this valve is such that it consumes no power when closed and only 4

BOILER ROOM EFFICIENCY

COMBUSTION EQUIPMENT LEAHY LOS ANGELES CAL. U.S.A.

The efficiency of a boiler cannot be higher than the efficiency of the furnace installed under it

WITH Leahy Dual Combustion Furnaces under the boilers...Boiler Efficiency can be maximum. Leahy Equipment embodying both oil and gas burners in one unit represents the highest development in industrial engineering. The Leahy Oil Burner will atomize any grade of fuel oil with a minimum amount of steam or air. The multi-jet gas burner, due to rapid ignition and low draft requirements, makes possible a high rating with maximum efficiency. In a few moments one fuel can be replaced with the other

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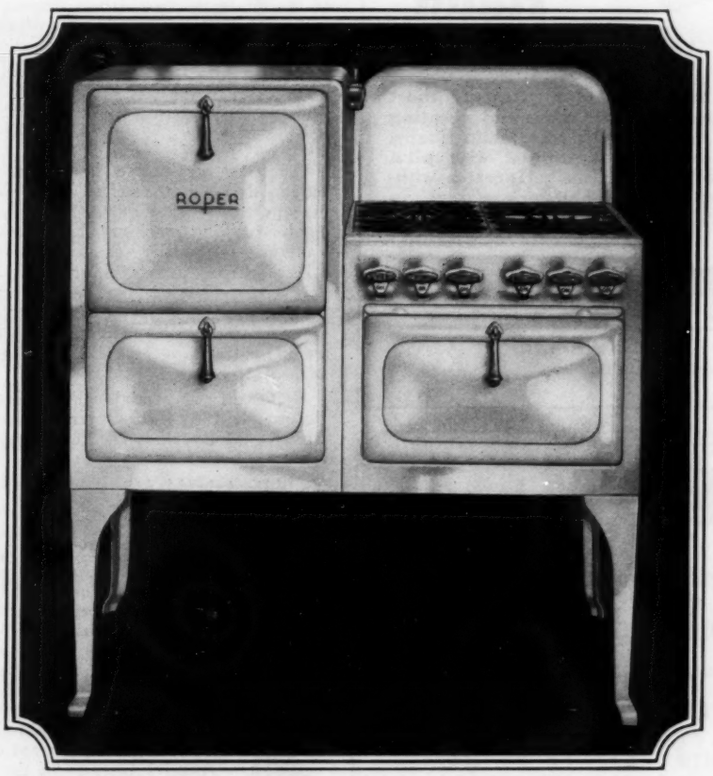

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14. Porcelain Enamel Oven Linings
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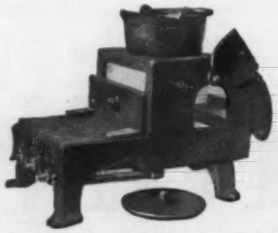
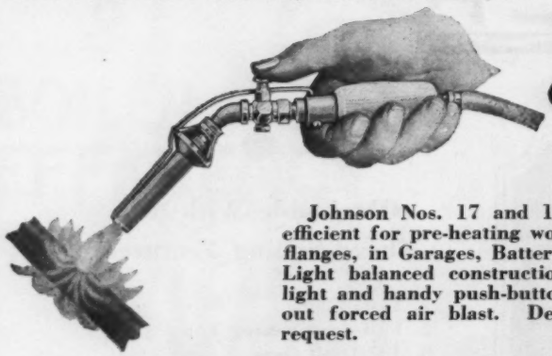


This Combination Furnace Will Help Cut Production Costs

The diversibility of the No. 118 makes it a most valuable piece of equipment in any shop. Designed for metal melting, heat-treating, heating soldering coppers and pre-heating work. The details and price of this compact gas appliance are worth having. May we send them to you?



JOHNSON Hand Torches

Johnson Nos. 17 and 18 hand torches are most efficient for pre-heating work, singeing and sweating flanges, in Garages, Battery and Sheet Metal Shops. Light balanced construction. Equipped with pilot light and handy push-button valves. Operates without forced air blast. Details and prices sent on request.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative—C. B. BABCOCK CO.
135 Bluxome St., San Francisco, Calif.

GROBLE
REGULATORS & GOVERNORS

Complete Line of Regulators for

Natural, Manufactured, Butane and Propane Gas

Pacific Coast Representative,

T. G. ARROWSMITH COMPANY,
661 Howard Street San Francisco, Calif.
Phone Garfield 8419

GROBLE GAS REGULATOR COMPANY
Office and Factory: Anderson, Indiana

TAPPAN

Supremacy

is not a newly-won achievement, but an old and accepted standing in the eyes of gas appliance men and the public alike. No other gas range combines so many outstanding superiorities into such a perfect whole—the TAPPAN Insulated Oven gas range.

H. R. Basford Co.
665 Howard St.
San Francisco

H. R. Mayer
1001 E. 1st St.
Los Angeles

F. W. Schwab
2512 N. Stevens
Tacoma

watts while being held open. It closes instantly in the event of power failure. The valve is spring operated and is not dependent upon gravity. It is available equipped with an auxiliary air damper control and it is furnished in six valve sizes from 1-inch to 3-inch. It can be supplied for 110-volt A.C., either 25- or 60-cycle.

Protective Materials and Methods Described

"Dependable Protection for Underground Pipe Lines", a twice-a-year publication of McEverlast, Inc., Los Angeles manufacturer of protective materials, has come from the press in its first 1931 edition. In addition to sections on the specific lines made or distributed by the company, the publication comments on soil characteristics and their determination, surface conditions, factors contributory to electrolysis, and other aspects of the protection problem. Among the protective materials on which information is given are the following: Penetration, G-100 Special, Electrolysis Proof, Osnaburg Wrapper, Somastic, J. M. Asbestos Pipe Line Felt, Kraft Paper, Luminite, "No.99", and 35-B—the last three being coatings designed for exposed metal surfaces.

Of particular interest in the booklet is the section devoted to mechanical application of pipe protective materials. Photographs show yard wrapping machines, and a machine for applying "Somastic," consisting of a mastic mixer which mixes and proportions the asphalt mastic and a yard wrapping machine which applies it. Hand wrapping apparatus for applying the Osnaburg wrap and Kraft paper or asbestos pipe line felt in the field is also illustrated.

Copies of "Dependable Protection for Underground Pipe Lines may be had by addressing McEverlast, Inc., Los Angeles, Calif.

To Entertain Heating and Ventilating Engineers

Saturday afternoon, February 7, the Natural Gas Bureau of Los Angeles, cooperative merchandising organization of the Los Angeles Gas and Electric Corp., Southern Counties Gas Co., and Southern California Gas Co., plans to entertain the Los Angeles chapter of the American Society of Heating and Ventilating Engineers at the main office of the Bureau. Luncheon will be served to the guests at 1:00 p. m., following which they will view the gas equipment on display.

The Los Angeles Chapter of the American Society of Heating and Ventilating Engineers has a membership of 60, comprised of engineers and men engaged in selling heating and ventilating equipment.

Vancouver Apartment Equipped With Gas Ranges

Gas ranges have been installed in each of the kitchens of the new Narad apartments, just completed at 15th Avenue and Main Street, Vancouver, B. C. This is a large apartment block with 20 suites. The Narad is the second apartment house in the district to be completely fitted out with gas cooking facilities by the British Columbia Electric Power and Gas Co.

370 Enrolled in "Contact" Class

San Antonio Public Service Co., San Antonio, Texas, recently reported an enrollment of more than 370 members in a class in customer contacts sponsored by the American Gas Association.

Paraphrasing that Famous Slogan—

"YOU CAN DO IT BETTER WITH MOORE'S"

The new 18 Series Puritan provides positive circulation plus an abundance of cheerful, controllable, radiant heat. It is the last word in gas heaters—a profitable item for you to sell—a source of lasting satisfaction to the buyer. - -

▼▼

There is a Moore representative near you who is not only a trained heating engineer but a merchandising expert. He will gladly help you build up your Puritan sales. May we send him to you? - - - - - -

There's no gainsaying the fact that Gas is the ideal fuel—and when burned in a Moore's Puritan Heater—well, it's just an unbeatable combination.

That's Why You Can Do A Better SALES VOLUME *with*

MOORE'S PURITAN

Gas Fired Circulating Heater

You don't have to put in your time convincing a prospect that the Puritan is a quality product—he knows it—the evidence is visible—besides it carries the Moore label—which is a guarantee of that quality.

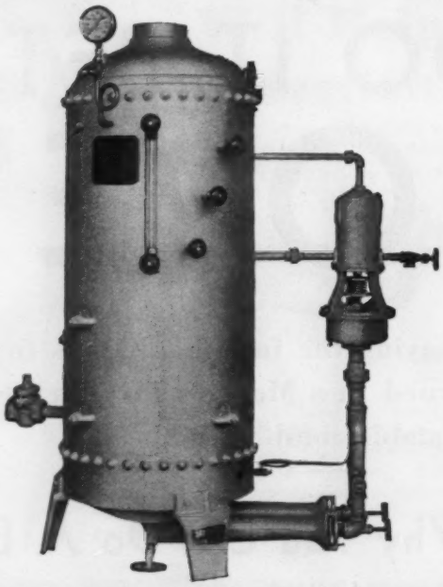
MOORE BROTHERS COMPANY

JOLIET - - - *Since 1857* - - - ILLINOIS

ORIGINATORS OF THE CIRCULATING HEATER

Automatic Gas Fired Boilers

LATTNER

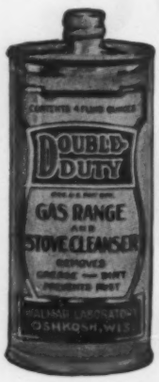


All Sizes from ½ to 30 H. P.

P. M. LATTNER MANUFACTURING CO.

Factory
516 12th Avenue
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California



ATTENTION! Commercial Members Gas Companies

A Spic and Span gas stove is a credit to the house-wife and can be kept that way by the use of

Removes Grease

DOUBLE DUTY
REG. U.S. PAT. OFF.

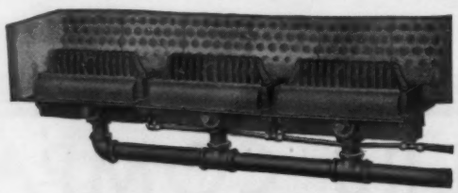
Prevents Rust

GAS RANGE & STOVE CLEANSER

WALMAR LABORATORY Oshkosh, Wisconsin

Western Distributor
C. B. BABCOCK CO., San Francisco, Los Angeles

R. M. C. Gas Burner



Durable Safe Economical

ROTARY MANUFACTURING CO.

5720 Long Beach Avenue Los Angeles, California

Portable Pipe Threader by Axelson Manufacturing Co.

Axelson Manufacturing Co., Ltd., Los Angeles, Calif., has recently placed on the market a portable threader, fully described in an 8-page pamphlet.

The threader is powered by a compound ½-h.p. motor and can be used on either 110- or 220-volt alternating current by plugging in to any light socket. The threader may be used on either pipe or bolts, ranging from ½ to 2 inches in diameter. It cuts threads at the rate of 17 revolutions per minute on all sizes from ½ to 2 inches. The required time for completing 11 threads is 40 seconds. After the thread has been cut, a reverse operation removes the die at the rate of 34 revolutions per minute. The entire operation is controlled by a gearshift lever.

The operating principles of the threading machine are as follows: A standard square die is revolved on the pipe, the pipe remaining stationary during the operation. The material to be threaded is held in place by two automatic jaw chucks. These pipe-holding brackets are mounted on two long slides in such a manner that the material to be threaded can be advanced as the die operates. The machine may also be used as a pipe vise.

The folder will be sent to anyone interested, on request to the company.

To Manufacture Large Diameter Mono-Cast Pipe

American Cast Iron Pipe Co., of Birmingham, Ala., announces the completion of a new pipe shop for the production of large diameter Mono-Cast pipe. The new shop is of fire proof construction, and is equipped with modern machinery throughout. It has a potential capacity of 200 tons of centrifugally cast pipe per shift, and is so designed that it can be operated on one, two or three 8-hour shifts.

Mono-Cast pipe is made in sizes 14-inch, 16-inch, 18-inch, 20-inch and 24-inch, and is 16 feet in length. It is bell and spigot type with the bead cast on the spigot end. The bead centers the spigot in the bell and anchors it, also offering protection against breakage to spigot ends in transit, and making the joint hold together in service.

More than 2,000 miles of Mono-Cast pipe in the smaller sizes are now in service. With the completion of the new shop for manufacture of the larger sizes, the company is in position to offer Mono-Cast pipe in diameters 4-inch to 24-inch inclusive.

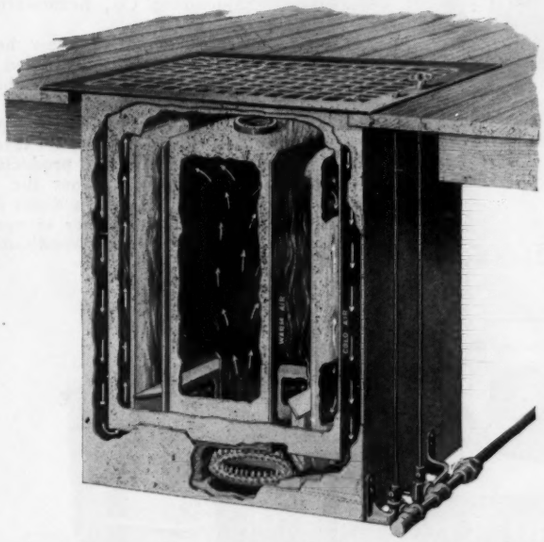
Gas Rates Filed With Commission

The Vinita Fuel Co., Vinita, Okla., has filed with the Corporation Commission a new schedule of rates effective December 23, 1930, applying to natural gas service at Vinita and available for all consumers as follows: 10c per 100 cubic feet for first 2,000 cubic feet; 60c per 1,000 cubic feet for next 10,000 cubic feet; 50c per 1,000 cubic feet for all gas used in excess of 12,000 cubic feet per month per consumer.

Pact Gas Co. Builds Line to Coyle and Langston

The Pact Gas Co., is constructing 6- and 4-inch gas pipe lines from Goodnight to Coyle and Langston, Okla., where the company has franchises or contracts to distribute natural gas. Pact Gas Co., is headquartered at Cushing, Okla.

REPLACE . . . *DON'T REPAIR*



that Defective Furnace

There's more money for you, better service for your customer, in a brand new PACIFIC FLOOR FURNACE. It will take no longer to install it than it would to repair an old furnace or other heating system, and you have paid yourself a real profit and done your customer a real favor.

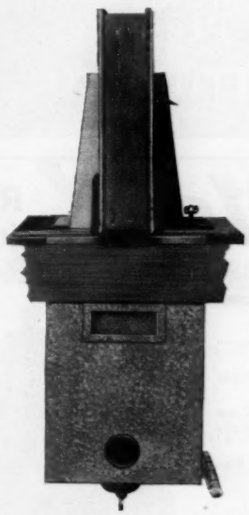
Winter weather shows up defective heating systems. Now is the time to sell Pacific Floor Furnaces and other modern Pacific Gas Appliances. Their first cost is moderate; they are economical to operate; they deliver the heating comfort your customers want.

THERE'S MONEY, RIGHT NOW, FOR YOU in a Pacific Gas Agency. Write today for full details, including the Pacific Sales Helps that really sell.

Features that Make this Furnace Better, and Easier to Sell

1. Floor or wall registers in antique bronze or brushed brass finish.
2. Five large heat radiating surfaces (four sides and top) utilizing all heat in gas.
3. New method of casing construction, exclusive with Pacific, keeps casing cool at all times, and insures abundance of air to heating chamber for reheating. **There is no heat loss through outer casing.**
4. Heating unit of 20-gauge pure ingot iron. Pressed and welded joints are absolute insurance against leakage. Extra heavy cast iron dome superheats air before it passes into room.
5. Raised-tip Bunsen type burners, with clean-drilled flame holes and soapstone tips. Long heat travel of burned gases and indirect method of venting allow hot gases to come in contact with greater radiating surface than possible in other designs.
6. Three sizes, to meet the needs of any type or size of building.
7. Adaptable to any type of modern electric or hand control.

Our Agency Proposition is Attractive . . . Write for Particulars on Your Locality



THE PACIFIC DUAL SYSTEM

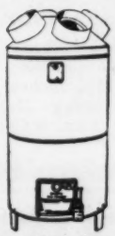
Identical in quality and construction with regular Pacific Floor Furnace, but has two registers. Delivers heat into two rooms at once, or may be used in either room alone. Every Pacific Furnace is fully guaranteed in every detail of material and workmanship, with nearly 20 years of reliable dealing behind the guarantee.

Pacific Gas Radiator

Gas Heating Company *Headquarters*

Roseberry and Walter Streets
Huntington Park California

Gas-Steam Radiators


Round Furnaces

Dual Pipeless Furnaces

Fireplace Radiant Heaters

Recess Radiant Wall Heaters

Automatic Storage Hot Water Heaters

Pipeless Floor Furnaces

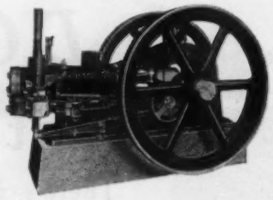
Gas Radiators—Pressed Metal and Cast Iron

Agencies Throughout the West

Call for a Pacific Heating Engineer

MANUFACTURERS *of* EVERY TYPE *of* GAS HEATING APPLIANCE

When we sell a CHARTER Gas Engine—some GAS COMPANY sells enough gas to wear it out.



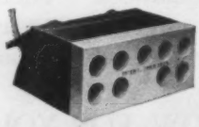
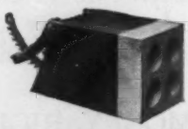
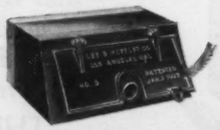
Since the life of a good gas engine is 20 to 30 years that is a lot of gas (about 4 times the sale price of the engine) that the gas company does not sell if we allow the power user to buy other kinds of power.

Charter Natural Gas Engines are made in sizes 25 to 200 h. p.
Heavy Duty, Slow Speed, Long Stroke Type.

LET US SEND YOU FULL INFORMATION

CHARTER GAS ENGINE COMPANY - STERLING, ILLINOIS

Manufacturers of Dependable Gas Engines Since 1880

Mettler Entrained Combustion Gas Burners

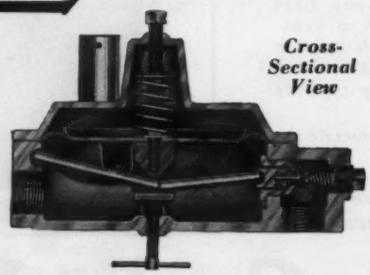
FOR ALL Purposes
Kinds of gas
Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

Reynolds Gas Control Since 1892

Reynolds Little Giant Regulator

Products for all kinds of Pressure Reduction—for either artificial or natural gas.
GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.
VALVE—Automatic Quick Closing Anti Vacuum.



Cross-Sectional View

Reynolds Gas Regulator Company
Anderson, Indiana

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature
and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

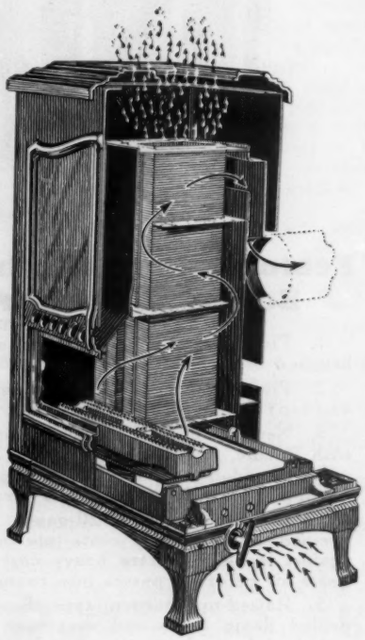
513 CENTRAL BANK BUILDING, DALLAS, TEXAS

Wedgewood Gas Fired Circulating Heater

A new Wedgewood gas circulating heater has been placed on the market by the James Graham Manufacturing Co., headquartered in San Francisco, Calif.

The heating element of the new heater is made of 18-gauge metal, all welded. A low vent makes it particularly adaptable to the fireplace. The top and base are cast, and the cast burner is designed with raised ports.

The heating element has five flues through which warm air passes and the products are diverted back and forth and out the rear into a flue box which contains a down draft diverter. This allows the heater to operate normally irrespective of draft conditions in the chimney.



A mica door in front is protected with copper wire screen.

The pilot light burns continuously and ignites the gas when it is turned on, eliminating the use of matches.

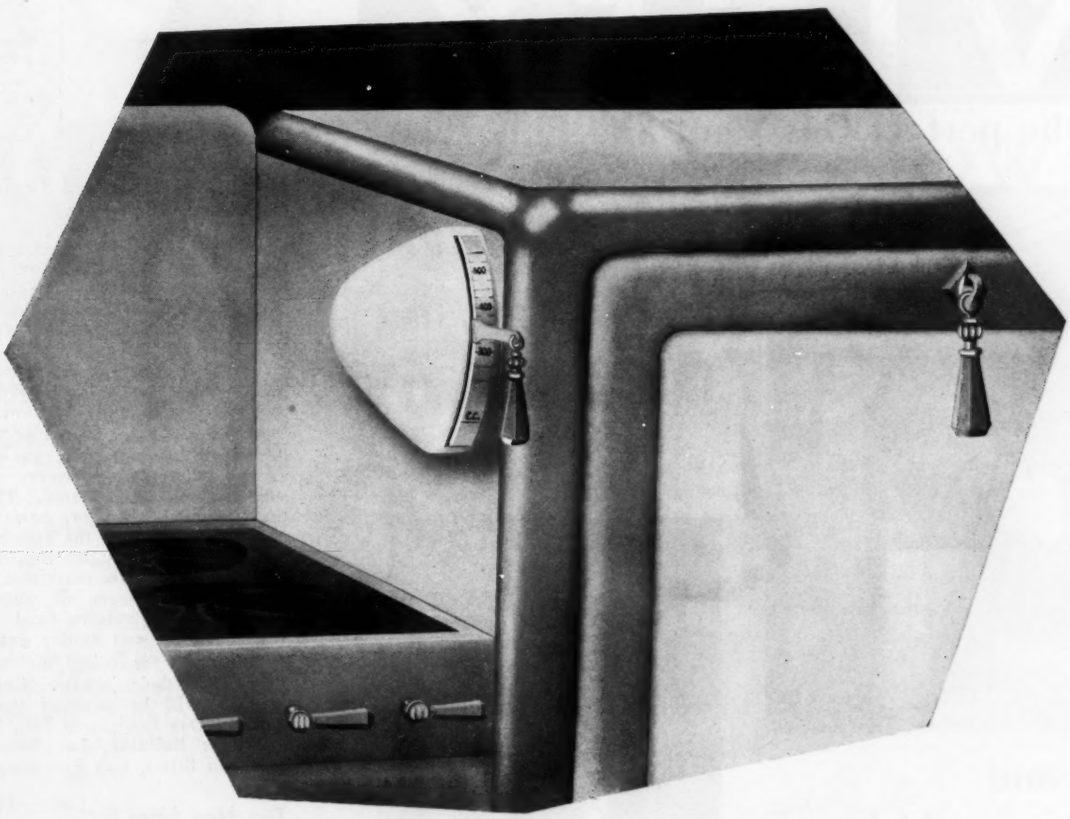
Following are the specifications of models No. 25 and 35 of the new circulating heater:

No. 35
Height, 37½ inches.
Width, 24 inches.
Depth, 15¼ inches.
To top of flue, 26½ inches.
B. t. u. rating, 35,000.
Heating area, 7,000 cubic feet in 30 degrees F.
Steam radiation equivalent, 116½ square feet.

No. 25.
Height, 33 inches.
Width, 20½ inches.
Depth, 15¼ inches.
B. t. u. rating, 25,000.
Heating area, 4,600 cubic feet in zero degrees F.
Steam radiation, 83½ square feet.

Mansfield to De Queen Line

Arkansas Valley Gas Co., Conway, Ark., is planning construction of a natural gas transmission line from Mansfield, to De Queen, Ark. The company has several franchises along the route of the line.



Announcing the New Wilcolator

– in step with Modern Range Design

Again Wilcolator is first to announce a new heat control suited particularly to the new vogue in gas ranges.

It has new beauty of design—with a control handle that is always *cool*, a handle that matches exactly the color of oven door handles.

It is a control that can be fully enameled to match the range colors and express the individual ideas of the range manufacturer. Temperature readings are visible from the front and with immediate cold calibration.

The control sets up close to the side of the oven and does not interfere with normal operation of the cooking top.

Manufacturers who are designing new ranges are cordially invited to investigate the possibilities of this new heat control.

THE WILCOLATOR COMPANY, Newark, N. J.

Specialists in Temperature Control for Household Appliances

VITEX

—the perfect Gas Vent and Flue Pipe

Light Weight
Non-Corrosive
Insulating

. . . and
Easier and Cheaper to Install than Heavy Types of Pipe . . . . . .

For fully descriptive catalogue and prices write

PLANT RUBBER and ASBESTOS WORKS

537 BRANNAN STREET . . . . SAN FRANCISCO

PR-070

GAS BURNERS

For

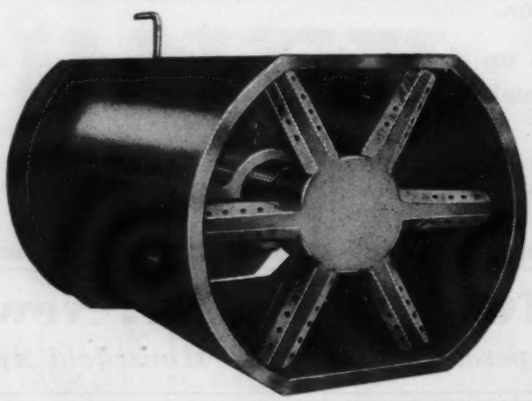
ALL INDUSTRIAL PURPOSES

JOHN ZINK CO.

Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA

★

Flameless Burners
Flame Burners
Short Flame Burners



N.G.E. Issues Revised Rapid Capacity Calculators

A revision has just been made in the N. G. E. Rapid Calculator for pressure regulators, based upon tests made at the plant of one of the major oil companies where several million cubic feet of gas were available. More than 1,000 copies of the Rapid Calculator as first issued have been distributed upon request of engineers and operators in the natural gas and petroleum industries.

A new calculator known as No. 2 has been developed, especially for gas fuel regulator service where low pressures and low pressure drops are encountered. The revision of the previous calculator, now designated as No. 1, takes care of the higher pressures up to 2,000 pounds. It has been extended to include a temperature correction, and to show values for air, steam, oil, water, and manufactured, wet, rundown fixed, and stabilizer waste gas, as well as dry gas.

Directions for using the calculators are printed on their jackets. Copies of either or both will be supplied upon request to Natural Gas Equipment Inc., 718 Petroleum Securities Building, Los Angeles; or 1123 Harrison Street, San Francisco.

Two New Lines for Oklahoma Natural Gas Corp.

The Oklahoma Natural Gas Corp., Tulsa, Okla., has announced plans for the immediate construction of two natural gas lines from the University Pool of Regan County, Texas.

Surveys have been made for 77 miles of 12-inch line from Texon to San Angelo to augment the supply of natural gas available for San Angelo. Construction on the line will start at once.

A survey is now being made for about 50 miles of 8-inch line from Texon to Rio Pecos to supply the Pecos Valley Power and Light Company of Rio Pecos.

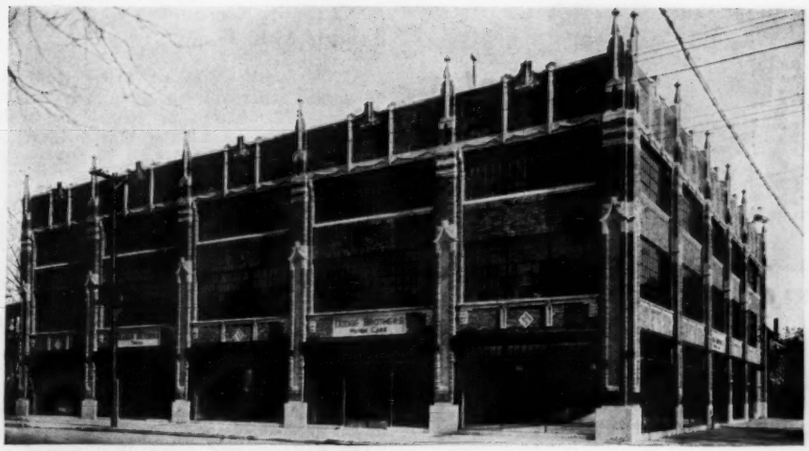
Construction of both lines will be by the Natural Gas Engineering Corp., of Tulsa. The two lines will cost between two and three million dollars.

New High Pressure Holders

Two new high pressure natural gas storage holders were placed in service by Southern Counties Gas Co., in its Pomona, Calif., district. Combined storage facilities of the holders totals 1,000,000 cubic feet and brings the storage capacity in the district to 1,550,000. Cost of the structures was approximately $94,000, making a capital investment in storage facilities in the district of $160,000.

To Open San Francisco Office

Moore Brothers Co., Joliet, Ill., will open an office in San Francisco, Calif., shortly after February 1, where a warehouse stock of Puritan heaters and Moore ranges will be carried. The new office will be under the direction of Charles J. Reilly, formerly in charge of the company's Rocky Mountain territory.



INDUSTRIAL HEATING WITH CLOW GASTEAM

Shelor Motor Company
Houston, Texas

Architects: Hedrick & Gottlieb, Inc., Houston, Texas

TYPE OF CONSTRUCTION AND HEATING REQUIREMENTS

Walls . . 4″ brick, 8″ tile
Ceilings . . . Concrete
Roof . . . . Concrete
Floors—Concrete, or tile on concrete

This is another type of building that is being successfully heated with Clow Gasteam Radiators. A study of the gas bills in comparison with the installed radiation testifies to the fuel economy of Clow Gasteam. The statement of this user reflects the satisfactory performance of Clow Gasteam:

" . . . . They have been entirely satisfactory and economical. We have nothing but praise for Clow Gasteam Radiators."

Cubical Contents	561,366 cu. ft.
Exposed Walls (Net)	12,071 sq. ft.
Glass and Doors	3,649 sq. ft.
Floor Space	43,182 sq. ft.
Degree Days	1,150

CLOW GASTEAM RADIATORS INSTALLED

Quantity	Size	List Price	Radiation, Sq. Ft.
1—	6 sec. 4 tube 26″ Unvented	$49.00	30
1—	8 sec. 4 tube 26″ Unvented	58.00	40
5—	10 sec. 4 tube 26″ Unvented	335.00	250
11—	12 sec. 4 tube 26″ Unvented	836.00	660
2—	15 sec. 4 tube 26″ Unvented	186.00	150
1—	6 sec. 4 tube 38″ Unvented	60.00	48
6—	8 sec. 4 tube 38″ Unvented	432.00	384
3—	12 sec. 4 tube 38″ Unvented	288.00	288
9—	15 sec. 4 tube 38″ Unvented	1035.00	1080
39		$3279.00	2930

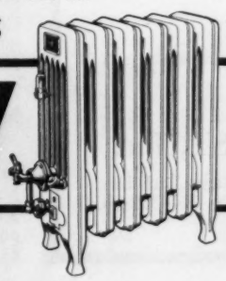
OPERATING COST—With Natural Gas

October, 1929	20,200 cu. ft.	$13.63
November, 1929	83,400 cu. ft.	54.71
December, 1929	153,600 cu. ft.	100.34
January, 1930	231,800 cu. ft.	151.17
February, 1930	170,800 cu. ft.	111.52
March, 1930	78,400 cu. ft.	51.46
April, 1930	65,200 cu. ft.	42.88
	803,400 cu. ft.	$525.71

Price of Gas: $.75 per M. cu. ft. less $.10 cash discount, plus $.50 service charge.

JAMES B. CLOW & SONS 201-299 N. Talman Avenue, Chicago

CLOW GASTEAM



Listed by Underwriters' Laboratories

Approved by A. G. A. Testing Laboratory

LIVE ON TOP OF THE WORLD...IN NEW YORK

Stop at New York's largest and tallest hotel . . . 2500 rooms . . . 43 stories high . . . every room has radio; both tub and shower; Servidor; circulating ice-water; full-length mirror; bed-head reading lamps. Four popular restaurants. Tunnel connection to Pennsylvania Station.

THE NEW YORKER

34th STREET AT 8th AVENUE, NEW YORK

RALPH HITZ : MANAGING DIRECTOR

KLIXON Products

offer the exclusive advantages of the Spencer Thermostatic Disc.

Write for circulars on automatic gas appliances.

Spencer Thermostat Co.
Cambridge, Mass.
B. W. MUELLER
Western Representative
447 Sutter St., San Francisco, Cal.

DEPENDABLE PROTECTION for Pipe Lines

McEVERLAST Coatings
+Mechanical application
+Engineering service
=Complete,
Dependable
Protection

McEVERLAST, Inc.
111 West 7th St. Russ Building
LOS ANGELES SAN FRANCISCO

A. O. Smith Corp. Reports 1930 Gains

A. O. Smith Corp., of Milwaukee, Wis., announces that during 1930 the company shipped 472,000 tons of electrically welded pipe to all parts of the United States, as compared with 425,000 tons in 1929, a gain of 47,000 tons.

The 1930 tonnage, according to Carl C. Joys, Jr., manager of pipe sales, consisted of about 3,000 miles, or 24,272 carloads. The mileage was nearly the same as in 1929, and the carloads compared with 30,474 in 1929. A larger quantity of heavier pipe was made during the year just closed than in the previous year, the figures indicate.

In the first five months of the company's fiscal year, August 1, 1930, to January 1, 1931, shipments amounted to 216,000 tons, or 9,720 carloads, against 126,000 tons and 8,698 carloads the same 1929 period. Increases for the five months' period come to 71.4 per cent in tons, 11.7 per cent in loads, and 63.4 per cent in miles.

Plant expansion was extensive at the A. O. Smith works during the year. Outstanding among the new additions was the new research and administration building, put up at a cost of about $1,500,000.

Two other buildings were put up by the company during the year. One of these a pilot plant for trying out new Smith processes on a semi-production basis, is ready for occupancy. The other is a structure designated by the company as Building No. 106, of brick and glass and steel, the equivalent in height of about 10 stories.

Opens Western Office In Los Angeles

Consolidated Ashcroft Hancock Co., Inc., has announced the opening of a Pacific Coast sales headquarters at 2318 East 8th Street, Los Angeles, Calif., with Charles Stepan, Pacific Coast manager, in charge. Sales operations of the company in states west of the Rockies, as well as British Columbia and Alberta will be directed from the Los Angeles office.

The San Francisco and Seattle agents will continue under Mr. Stepan's direction. The company has terminated its agency arrangement with W. R. Ladewig in Los Angeles, but Mr. Ladewig will continue to handle the company's goods under his own name.

Assisting Mr. Stepan in the Pacific Coast headquarters are E. H. Price, sales engineer, and P. M. Rolli, office manager. In addition to stocks carried at Los Angeles the company will also maintain a service and repair department, and will shortly establish a school for the education of those interested in the use of its products.

Canadian Valley Gas Co. To Serve Supply

A natural gas franchise was granted on January 6 to the Canadian Valley Gas Co., by citizens of Supply, Okla. The gas will come from the mains of the Public Service Co. of Texas, which now furnishes natural gas to the Western Oklahoma Hospital, located north of Supply.

New Natural Gasoline Grading

New specifications for the grading of natural gasoline have been adopted by the Natural Gasoline Association of America. The new specifications will become effective on January 1, 1932, and will be optional in 1931.

MINNEAPOLIS-HONEYWELL

means

reliable *automatic controls*

and quick, thorough service

Out here in the West, gas house-heating consumers may not yet be convinced of their need for automatic heat controls.

They didn't "need" gas heating, either until you showed them what it meant to them in terms of comfort and lasting convenience.

Today the same records that picture the recent tremendous increase in gas house-heating show a steady, irresistible increase in the number of installations completely equipped with automatic controls.

This is no surprise to gas company executives who have studied house-heating history and experience in other parts of the country. It is proof of the fact that when people want comfort, they want *complete* comfort. When they want heating convenience, they want *complete* freedom from even the slightest janitor duty. When they want fuel economy, they want to save *all* the fuel they can possibly save, consistent with perfect comfort.

The inevitable trend, wherever house-heating is needed, is toward automatic heating that is *completely automatic*.

No wonder, then, that Western gas officials are placing greater emphasis on the need for automatic controls on every installation.

And as the demand for reliable automatic controls increases, it is no wonder that the majority of such controls installed bear the name, Minneapolis-Honeywell. For this name stands for reliable operation. It is known from Coast to Coast as the symbol of dependability.

And it is known among gas house-heating men as the sign of quick, thorough, reliable, well organized service. Minneapolis-Honeywell service engineers are on the job everywhere. They stand back of every Minneapolis-Honeywell installation on your lines.

Minneapolis-Honeywell Regulator Company

CALIFORNIA BRANCH

557 Market Street, San Francisco, California

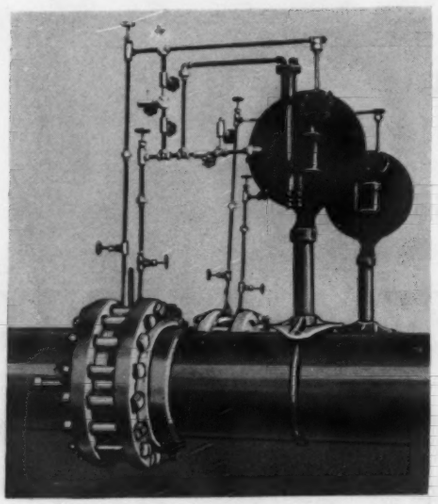
DISTRIBUTORS

Portland, Seattle, Salt Lake City, Denver

MINNEAPOLIS
HONEYWELL

Automatic Heat Controls

Measurement Today Demands Accuracy



The value of the fluid flowing daily thru your Orifice Meters makes accuracy imperative.

Papico Orifice Meter Assemblies

Insure dependable measurement—fabricated from carefully selected pipe of uniform internal diameter—micrometed and calibrated flow tubes with all steel Van Stone Flange construction provide a meter run in keeping with modern gauge precision.

Write for Catalog H

Pacific Pipe & Supply Co.

1002 Santa Fe Avenue

LOS ANGELES, CALIFORNIA

STANDARD MANAGEMENT & OPERATING CORPORATION

225 Bush Street San Francisco, Calif.

PUBLIC UTILITY MANAGEMENT
ENGINEERING AND CONSTRUCTION
REPORTS AND APPRAISALS

The staff includes the following who have been associated with successful nation-wide public utility enterprises for several years past.

R. N. DREIMAN
E. F. ENGLISH — JOHN COLLINS, JR. — A. E. HALL
E. A. OLSEN — J. B. WILSON — CHAS. GRUNSKY

Patrick Goodman Dies After 40 Years in the Industry

Patrick Goodman, president of the Safety Gas Main Stopper Co., Brooklyn, N. Y. died on January 5, following a short illness. The deceased was founder of the company of which he was chief executive and had been connected with the gas industry for nearly half a century.

After coming to the United States from Ireland, Mr. Goodman was employed by the Standard Gas Light Co., affiliated with the Consolidated Gas Co., of New York. He became superintendent of the company, and in 1897 resigned to form his own company for the manufacture of the safety gas main stopper which he invented. In addition to his activities in the gas industry, Mr. Goodman did contracting work, and laid the first pneumatic mail tubes in the city of New York.

Mr. Goodman was 71 years of age at the time of his death, and is mourned by a host of friends in the gas industry.

Gains in Gas Sales for Southern Natural Gas Corp.

Southern Natural Gas Corp., headquartered at Birmingham, Ala., reports that since the middle of the year there has been a marked quickening of industrial activity in the territory it serves, as reflected in the following monthly total of gas sales from July to December, 1930:

July, 261,074,000 cubic feet
August, 329,081,000 cubic feet
September, 404,463,000 cubic feet.
October, 723,033,000 cubic feet
November, 818,423,000 cubic feet
December, 835,067,000 cubic feet

Following the holidays activity was renewed, with one steel company using 110,000,000 cubic feet of gas during the week ending January 10, and other industries also speeding up production.

N.G.E.'s New Wilgus Catalogue

A catalogue of Wilgus automatic regulators for fluid pressures (gas, steam, liquids, or vapors) has been issued by Natural Gas Equipment Inc., Petroleum Securities Building, Los Angeles, Calif.

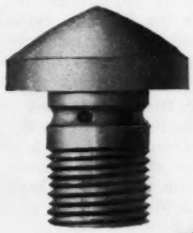
The catalogue consists of 60 pages and cover; and includes reducing, back pressure, gas fuel, vacuum and differential regulators, motor valves, pump and compressor governors, N. G. E. liquid level controllers, and balanced lever valves. It is profusely illustrated, and contains prices and dimensions of all equipment. Copies will be supplied upon request.

State Fuel Suppy Co. Serving Verden

State Fuel Supply Co., began service of natural gas in Verden, Okla., on December 19, completing installation of the distribution system and construction of 8 miles of gas transmission line within 30 days. The same company will soon start construction of a natural gas transmission line from the Sinclair well east of Laverne, Okla., to Laverne, where a gas distribution system will be installed. The company also secured natural gas franchises during November and December in Binger, Hydro, Lookeba, Hinton and Gracemont, all in Oklahoma.

LAVA

PILOT TIPS AND BURNER HEADS



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Different styles have been made by us

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Gas Appliance Manufacturers

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Send us your Samples and Blue Prints

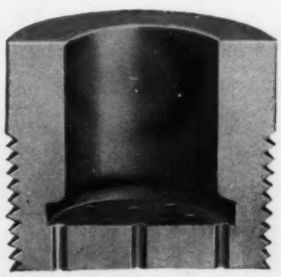
INDUSTRIAL GAS BURNERS

Lava is the non-corrosive, unchangeable material from which for 50 years all Gas Tips have best been made

INDUSTRIAL GAS APPLIANCE MANUFACTURERS

Have you tried our Patented Lava Tips for Natural and Manufactured Gas? Some of the many Industrial uses include smoke houses, core ovens, Japanning ovens, soft metal ovens, electrotype furnaces, etc.

PRACTICALLY EVERLASTING — CHEAPER — BETTER — NON-CLOGGING



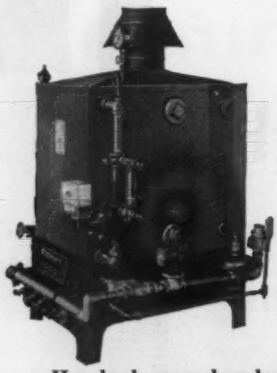
Covered by U. S. Patent No. 1498,644

Send for our booklet describing the nature of our material and illustrating its machining adapability to any form.

AMERICAN LAVA CORPORATION

1431 Williams St. Chattanooga, Tennessee

Also manufacturers of Extruded Magnesia and Lava Heat and Electrical Insulating Parts.



The Pittsburg A Famous Boiler

The crowning engineering achievement in the gas boiler industry has been the design and perfection of the famous "Pittsburg" Boiler, the most advanced gas-fired house-heating boiler of the day.

Hundreds upon hundreds of installations have definitely proven the superiority of the "Pittsburg," achieving a fame that is rapidly spreading to all parts of the country.

Back of the design and construction of the "Pittsburg" Boiler rests the manufacturing resources of the worlds' largest water heater manufacturers—The Pittsburg Water Heater Company.

The "Pittsburg" label on these boilers is your assurance of the highest mechanical and engineering perfection, a service organization that extends into every town and city of any importance in the land, and an iron-bound guarantee of proven dependability.

Just as "Pittsburg" Water Heaters have demonstrated their superiority, so you will find "Pittsburg" Boilers rendering unsurpassed service wherever installed.

Write for booklet, prices and discounts.

"Efficient House Heating With Gas."
"Pittsburg House Heating Boilers."

Pittsburg Water Heater Company
Factory and General Office: Pittsburgh, Pa.
Offices in all principal cities.

In 1931–

As in all the years since this organization was founded in 1875, quality of products and quality of service will be our watchwords. We have a continuing awareness that every Shape of Clay that leaves our kilns bears responsibility for our time-built reputation.

Gladding, McBean & Co.

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PORTLAND
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NEW YORK'S NEW
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Where modern scientific planning and management make possible rates surprisingly moderate. 1400 Rooms, each with bath and shower.

$3-5 For One $4-7 For Two

Telephone Lackawanna 1400

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Times Square · NEW YORK

W. Re. Brown With Lee B. Mettler Company

W. Re. Brown is now representing the Lee B. Mettler Co. of Los Angeles, throughout Texas and Louisiana. Mr. Brown is well known throughout the natural gas industry because of his special services with the Natural Gas Association. For 10 years he was in charge of the gathering of new ideas and improvements in appliances that were made available for the industry through the Wrinkle Department of the Association. Mr. Brown also founded the magazine "Natural Gas" and was its editor for seven years.

For 14 years Mr. Brown was new business manager of the Ohio Fuel Gas Co., the parent company of the Columbia Gas & Electric Corp., in charge of the development of industrial and domestic gas load. During part of that time he was also secretary of the Engineers and New Business Managers Club, an organization which did much to encourage and develop the sale of natural gas through high grade appliances.

For the past two years he has represented the Roberts-Gordon Appliance Corp. in Ohio, West Virginia and Kentucky.

R. F. Cathcart, who has represented the Mettler Co., in Southwestern territory for several years, has given up the work to devote time to personal business interests. Mr. Brown has not yet established a headquarters office, but will probably locate in Houston, Texas.

Gas Products Ass'n. Mid-Winter Session

The Annual Mid-Winter Meeting of the Gas Products Association was held at the Sherman Hotel, Chicago, Ill., on January 27 and 28, 1931.

"Possibilities of Increasing Sales of Oxygen, Acetylene, Hydrogen and Gas Welding and Cutting Apparatus and Supplies During the Coming Year," was announced as the subject of the meeting.

A series of demonstrations were given of correct sales presentations of these products to the customer. The purpose of this is to stimulate a study of the requirements of the customer and an intelligent presentation of gas welding and cutting processes to the buyer.

Bulletin Describing Cauldron Furnaces and Solution Heaters

Surface Combustion Corp., formerly Surface Combustion Co., has issued a new bulletin, No. 1840-30, on gas fired cauldron furnaces and solution heaters. The bulletin describes the improved cauldron furnace stating that it offers an economical means of applying heat to a variety of processes where heat is an agent in bringing about a desired chemical or physical change.

Some of the more common uses of cauldron furnaces and solution heaters are: Lard rendering, preparation of syrups, meat cooking, bluing manufacture, dye boiling, wax melting, manufacture of soaps and compounds, varnish making, ink manufacture, compounding drugs and face creams, and sterilizing bottles and containers.

Editor's Assn. Elects Hicks

Jos. W. Hicks, publicity director, Byllesby Engineering and Management Corp., Chicago, Ill., has been elected to the presidency of the Industrial Relations Editors Association of Chicago.

Electrolux chosen for

New Bronx Apartments

WHAT a record for sales Electrolux has hung up in the Bronx—second largest borough of New York City!

During the first nine months of last year, 74 new apartments were built in the Bronx. Apartments ranging from 10 to 100 families apiece. And for 62 of these modern apartment buildings, Electrolux was the choice!

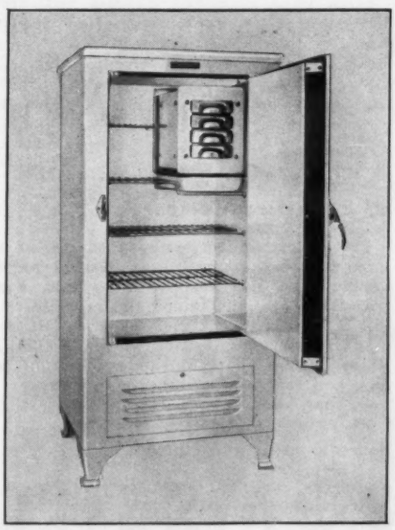
Not every community offers such industrious building projects as the Bronx. Yet every day you see apartment houses going up about you. Three or four a month, perhaps. Dwellings with 10, 20, 30 apartments apiece. Every one offering a ready market for Electrolux!

Suppose these apartments in your territory averaged only 20 apartments each. Every Electrolux installed would increase billing approximately 18 MCF yearly—or a total of 360 MCF for each apartment house!

Progressive gas companies have been quick to grasp the enormous load-building possibilities of Electrolux. Electrolux transforms small "convenience" accounts into permanently profitable accounts . . . builds up the off-hour load . . . creates new prestige for the gas industry.

Electrolux is the choice of tenants and apartment owners from coast to coast. Tenants prefer Electrolux because of its silence . . . its economy . . . its absolute dependability. Owners want the freedom from refrigeration complaint that Electrolux gives.

So don't wait. Write today for "Plan A"—a complete sales campaign to help you go after the profitable apartment market in your community. Electrolux Refrigerator Sales, Inc., Evansville, Ind.



THE KITCHENETTE—*one of the popular Electrolux models—adds approximately 1500 cu. ft. monthly to your domestic load.*

ELECTROLUX

THE *Gas* REFRIGERATOR

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

There are thousands of happy homes being heated Cleanly, Healthfully and Economically with Natural Gas ..... thru the "Matchless"
Electrogas
FLOOR FURNACE
Proven economy and efficiency through ten years of service
see it demonstrated

ELECTROGAS FURNACE CO.
466 Sutter Street
San Francisco
Write for Attractive Dealer Proposition

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Reg. U. S. Pat. Office
U. S. and Foreign Patents Granted

WILLIAMS
GAS STEAM RADIATOR

Made in 22 sizes from 26 to 180 feet of rating.

IMMEDIATE HEAT **AUTOMATIC LIGHTER**

Improved Combustion. **Positive Gas Control.**

Write for descriptive matter and prices.

WILLIAMS RADIATOR COMPANY

1865-1873 Cordova St. **Los Angeles, Calif.**

One agent wanted in each of several cities.

Smithwelded Pipe Featured in Bulletin

A. O. Smith Corp., Milwaukee, Wis., has recently brought from the press a 52-page, two-color publication, featuring "The New Way of Designing and Building Gas Lines with Smithwelded Pipe."

A paper entitled "Factors Effecting a Minimum Cost of Gas Pipe Lines," delivered by W. R. Kepler, assistant chief engineer of the company, before the 12th Annual Convention of the American Gas Association, is the leading feature in the brochure. This paper also appeared in the November and December issues of *Western Gas*.

Another section of the booklet is devoted to descriptions and photographs of recent construction jobs in which Smithwelded pipe was used.

"Engineering Data on Smithwelded Pipe" on pages 45-50 gives information on weights, diameters and pressures, together with line drawings of typical expansion joints, pipe bends and field joints.

Copies of the booklet, styled Bulletin No. 510 by the company, may be obtained upon request.

More Gas Reserves for Pacific Gas and Electric Co.

Pacific Gas and Electric Co., San Francisco, Calif. has purchased a half interest in the Dudley Ridge Oil Co., which controls between 5,000 and 6,000 acres of gas territory east of the base of Kettleman Hills field. This gives the Pacific Gas and Electric Co. access to the reserves of the Lake Tulare region. Large deposits of gas have been developed in this territory at 1,100-foot depths. The company's gas transmission system is so located that it can be connected to the Dudley Ridge area.

7,000,000, Cubic Foot Well For Texas Gas Utilities

Coming in on New Year's Day with an open flow of approximately 7,000,000 cubic feet of natural gas daily, Texas Gas Utilities Co., has added a second large well to its holdings within a two-month period. The new well, known as Pryor No. 2, is located on the company's Zavalla County properties.

From its Rycade and Zavalla field wells the company supplies entire fuel requirements of the Devil's River electric generating plant of Central Power and Light Co., as well as domestic distribution systems in cities and towns in the Winter Garden district of Texas.

Cogdell Now With H. R. Basford Company

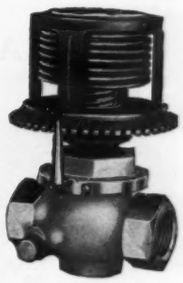
L. L. Cogdell, formerly in charge of the sales crew on domestic gas heating for the Pacific Gas and Electric Co.'s San Francisco Division, has joined the sales force of the H. R. Basford Co., Northern California manufacturers representative and agent for Ruud heaters, Tappan ranges, Sprague meters, and representing other manufacturers of gas appliances.

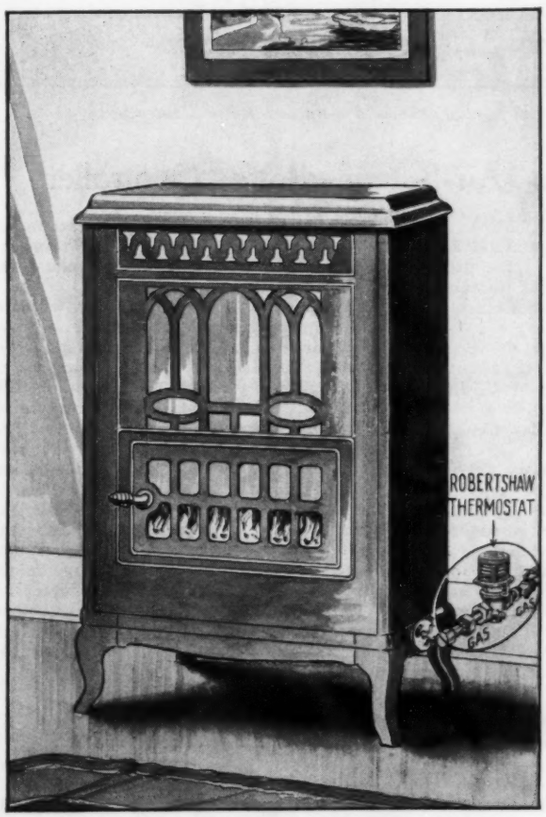
Mr. Cogdell will specialize on the sale of domestic heating equipment.

E. A. Jones in New Post

E. A. Jones, formerly with the Empire Companies, on January 1 took up new duties as cashier of the Bartlesville Gas and Electric Co., Bartelsville, Okla.

Another ROBERTSHAW Source of Extra Profit





The ROBERTSHAW Space Heater THERMOSTAT

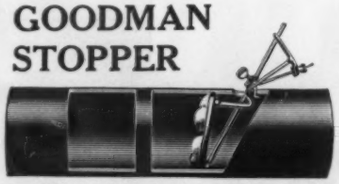
WHEREVER space heaters are used . . . either new or old . . . the Robertshaw Space Heater Thermostat will give you extra profits. It provides the economy of automatic control . . . just as essential in the gas fired space heater as in the gas range or the gas furnace.

The Robertshaw is small, compact, and attractively finished. Simple and durable, it is most easy to install at any time. And it is both automatic and ever dependable.

By adding this No. 2E Robertshaw to the space heater, the owner obtains that even, controlled heat which is such a vital safeguard of health and comfort. Be sure you know the attractive extra profits to be made with this much needed thermostat. Write today for the complete proposition.

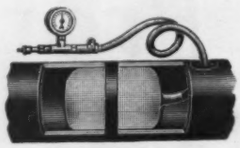
ROBERTSHAW THERMOSTAT COMPANY
YOUNGWOOD, PENNA.

THE
GOODMAN
STOPPER



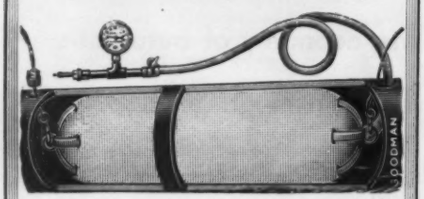
WHEN LOCKED IN PLACE IT HOLDS

DEPENDABLE GAS
MAIN BAGS



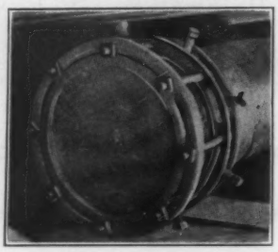
Type C

GOODMAN CYLINDRICAL
STOPPER FOR INTER-
MEDIATE PRESSURE



Increased Length for Increased
Pressure

KRUPA-HENDRY
TEST CAP



For Testing High Pressure Lines

SHIPMENTS FROM STOCK

SAFETY GAS MAIN
STOPPER COMPANY

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135 Bluxome Street, San Francisco
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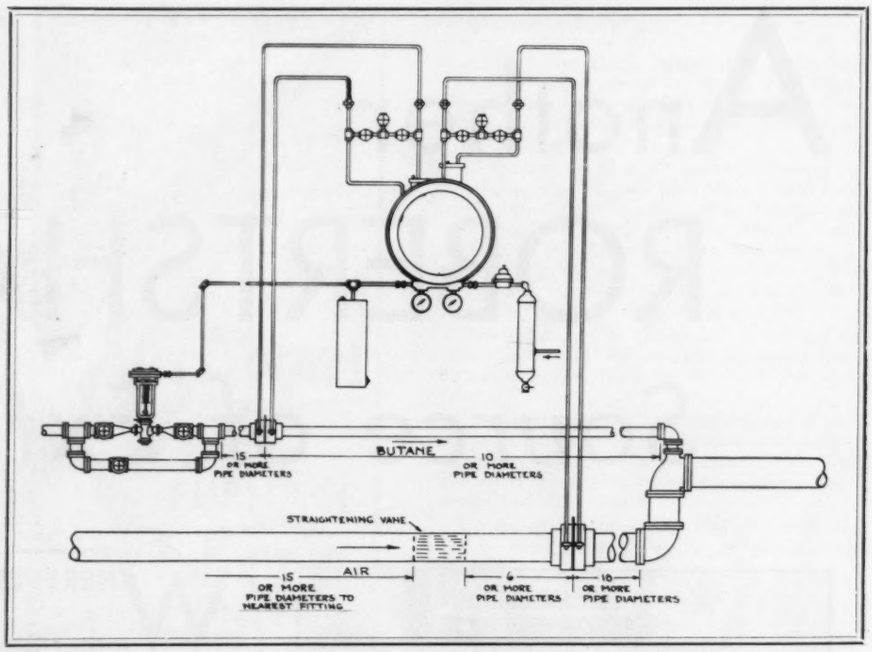

BUTANE
15 OR MORE PIPE DIAMETERS
10 OR MORE PIPE DIAMETERS
STRAIGHTENING VANE
AIR
15 OR MORE PIPE DIAMETERS TO NEAREST FITTING
6 OR MORE PIPE DIAMETERS
10 OR MORE PIPE DIAMETERS

Line diagram of the new Foxboro Air-Butane Ratio Controller

New Foxboro Air-Butane Ratio Controller

THE Foxboro Co., Foxboro, Mass., has manufactured an instrument to automatically mix butane and air in the proper ratio for air-butane plants. This instrument is called a "Ratio-Flow Recorder-Controller" and is based on the orifice principle.

Like other Foxboro controllers it operates a controlled valve with air or gas under 15 pounds per square inch pressure. In its essentials, the ratio controller is two instruments in one—a flow meter and a flow controller.

The accompanying sketch shows a typical layout. The meter side of the instrument is connected to an orifice flange union in the air line. The controller side is connected to an orifice flange union in the butane line. Both orifice plates are on the suction side of the booster; therefore, the downstream or static pressure in both lines is the same and the resulting ratio of volume or B.t.u.'s is constant. As the demand or load varies the differential across the orifice in the air line will change. This change will reset the control point and cause the flow controller to re-adjust the controlled valve, thus maintaining the required ratio.

The ratio controller is equipped with two pens, one operated by the meter, giving a record of the changes in differential pressure of the air, the other attached to the controller giving a record of the butane differential pressure changes. Both pens will record approximately the same differential pressure if the correct ratio is being maintained. To remove the difficulty of reading the chart with one record appearing directly over the other the pens of this ratio controller have been adjusted to operate 10 divisions apart for the same differential reading. A special chart to allow for accurate readings has been provided to take care of this difference.

Complete information on this new instrument may be secured by writing direct to The Foxboro Co., 38 Neponset Avenue, Foxboro, Mass.

Natural Gas Bureau Entertains Architects

CONTINUING its policy of placing the activities of the organization before certain representative groups, the Natural Gas Bureau, cooperative merchandising organization of Southern Counties Gas Co., Southern California Gas Co., and Los Angeles Gas and Electric Corp., entertained architects of southern California on January 22 with a dinner and program, held at the main display rooms of the Bureau, in East Washington Street, Los Angeles, Calif.

Lyle Vance, exhibit manager of the bureau, reports that 180 architects and guests, together with representatives of the three gas companies, sat down to a turkey dinner at 6:30 p.m. "Among those present" were architects from Los Angeles, Hollywood, Pasadena, Alhambra, and Santa Monica.

Following the dinner came a talk by H. W. Geyer, industrial engineer for Southern Counties Gas Co., on "Utilization of Natural Gas," featuring especially its use in residential and commercial buildings.

A feature of the program was the address by Roy Bauer, office engineer for Southern California Gas Co. Mr. Bauer reviewed the history and development of natural gas in southern California, explaining the equipment necessary to bring the modern fuel to a city the size of Los Angeles.

Following Mr. Bauer's address, a vaudeville entertainment was staged for the benefit of the guests.

The architects were then invited to view the special exhibit which had been assembled for their benefit. Some of the portable industrial equipment was removed for the occasion, and was replaced by displays put in by dealers in gas appliances, featuring the latest types of domestic ranges, refrigerators, unit heating equipment, floor furnaces, gas steam radiators, and incinerators. Exhibitors were on hand to explain in detail the operation of their appliances.

Sensational New Values-

RAY VITALITE GLO

Radiant Gas Heaters

By far the most important price announcement that Ray-Glo, pioneer maker of radiant heaters, has ever made! Sharply lowered prices now throughout the entire line, on models of greatly enhanced beauty. AND . . . mark this! . . . a price range that extends down to the lowest at which almost any sort of a heater seems possible!

Achieved with no letdown of Ray-Glo quality, no compromise with those high standards of precision and perfection that have won for Ray-Glo a standing as in a class all its own. Possible just because Ray-Glo is anticipating NOW the lowered costs of greatly increased production with values to attain it most quickly.

Hold Up Your Orders—

Even for the Lowest Price Heaters!—

Until You Have Full Details

Ray-Glo representatives are out in the field NOW, covering it as rapidly and thoroughly as possible. One will probably call on YOU soon—wait for him. It will pay you.

Or, if you prefer, write or wire today to the factory and ask us to get the good news in detail to you at once.

RAY-GLO CORPORATION

Athens, Ohio

FOR DEPENDABLE SERVICE RELIANCE REGULATORS

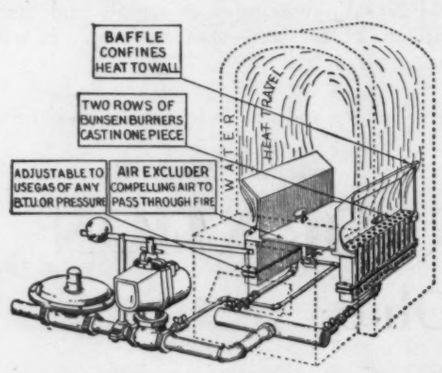
Reliance Manufacturing Co.

ALHAMBRA, CALIFORNIA

ISBELL PORTER CO.
Newark, New Jersey

N. W. GAS & ELECTRIC CO.
Portland, Oregon

WESTCOTT & GRIES, Inc.
Dallas, Texas
Houston, Texas
Tulsa, Oklahoma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TWO ROWS OF BUNSEN BURNERS CAST IN ONE PIECE
ADJUSTABLE TO USE GAS OF ANY B.T.U. OR PRESSURE
AIR EXCLUDER COMPELLING AIR TO PASS THROUGH FIRE
WATER
HEAT TRAVEL

Perfect combustion correctly applied insures maximum efficiency

Noiseless, Sootless

Ideal for any size cast iron and fire-box boilers.

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Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

SITUATIONS WANTED—MALE

Gas heating engineer desires connection in middle west. Applicant is 32 years old and has had a technical education. He has had over 12 years experience as heating and ventilating engineer and is familiar with design, combustion, sales, installation, and service of all types of gas boilers, furnaces, space heaters, conversion equipment, and control equipment. Address Box B-107, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Mechanical engineer and draftsman, experienced laying out, drawing plans and specifications for gas compressor stations and natural gasoline absorption plants; also several years executive experience, desires position with company needing qualified man. Applicant is 29 years of age. References and record of experience gladly given. Available on short notice. Address Box E-111, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Gas engineer, experienced in commercial boiler and industrial kiln operation, seeks position. Mechanical and technical knowledge of fuel measurement supply, diffusion and consumption. Past three years sales and engineering of measurement and control devices to industrial consumers in Mid-Continent states. Address Box E-113, *Western Gas,* 124 West 4th Street, Los Angeles, Calif.

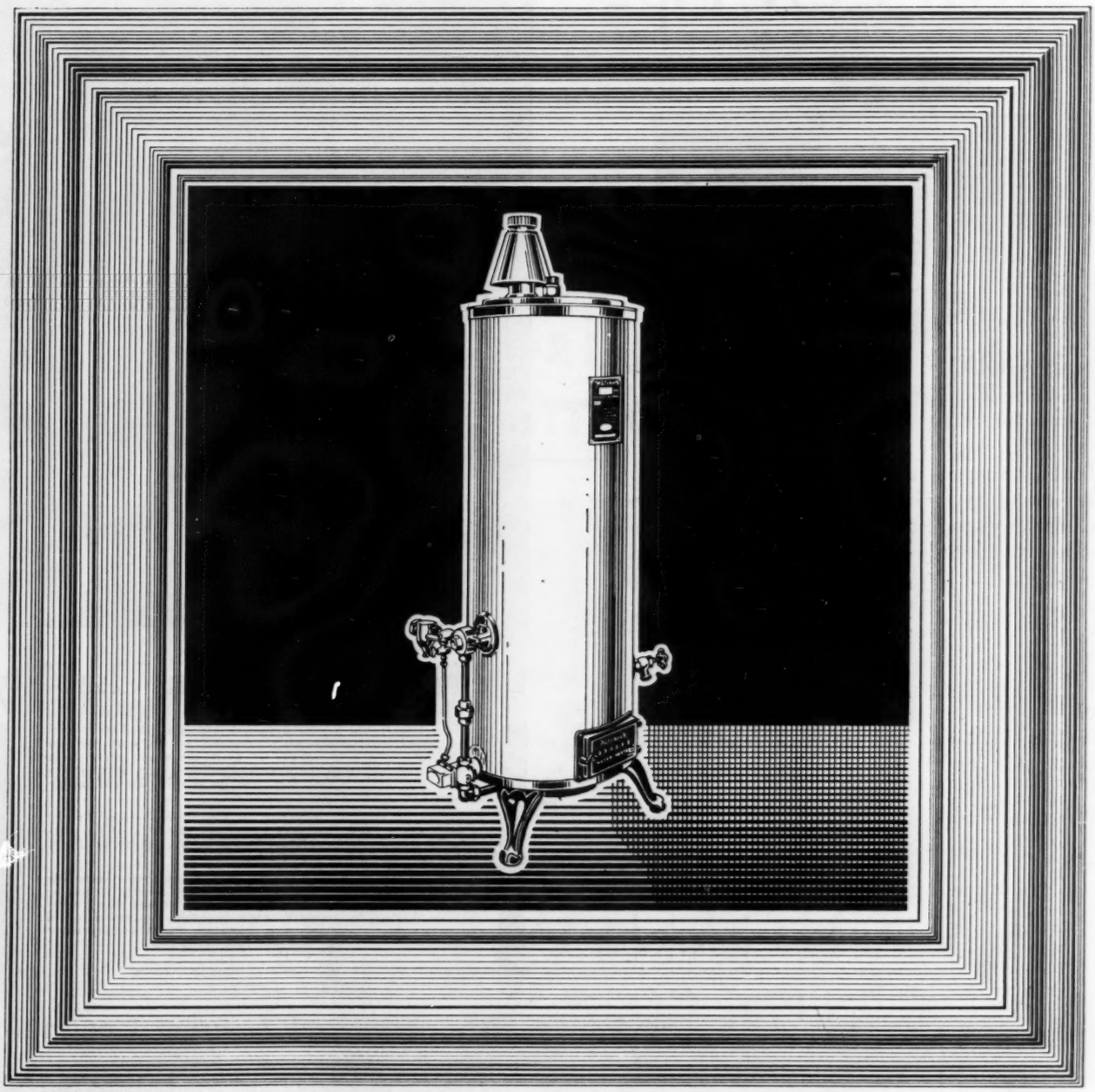
Gas compressor station engineer desires connection in West or Mid-West section. Applicant is 25 years old; married; has college education in engineering; has helped erect four natural gas compressor stations, 720 to 10,000 H.P.; and has been employed in these after completion without loss of time for 4½ years. Address Box E-109, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Man experienced in gas distribution desires position. Applicant is 29 years of age, has had 11 years' experience in consumers' complaints, installations and servicing, both industrial and domestic. Can furnish references. Experience has been in natural, manufactured and butane gas. Address Box E-115, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

As Distinguished in Sales Value to the Commercial Manager as it is in Eye Appeal and Lasting Satisfaction to Your Customers.

Welsbach HOTZONE

SELF-ACTION STORAGE GAS WATER HEATER



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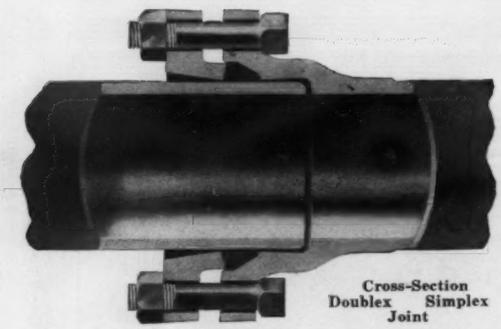
50 Hawthorne Street, San Francisco 226 So. Wabash Avenue, Chicago, Ill.

up to 600 Pounds Pressure with DOUBLEX SIMPLEX Pipe



Cross-Section Doublex Simplex Joint

ALTHOUGH the lightest weight Doublex Simplex Cast Iron Pipe is rated at 150 pounds working pressure, it is regularly furnished for higher pressures up to 600 pounds. Under impartial supervision, a Doublex Simplex test line maintained 200 pounds pressure for 10 days without leaking. The prominent mid-western engineer who made the test said "we found it impossible to make it leak under ordinary hard usage." Doublex Simplex pipe combines the well-known corrosion-resisting qualities of cast iron pipe with a joint that withstands high pressures, at the same time providing for unusual joint deflection and ample allowance for expansion and contraction. A common laborer can lay Doublex Simplex pipe with only one tool—a ratchet wrench. Write nearest Acipco office for descriptive literature and quotations.

AMERICAN CAST IRON PIPE CO.

BIRMINGHAM, ALABAMA

New York City, Chicago, Minneapolis, Kansas City, Cleveland, Detroit, Dallas, San Francisco, Los Angeles, Seattle.

312G

DIGS Where and When you want it!

Delivering Maximum Usability

Your trench may be for a long line where speed and uninterrupted performance are demanded, or the work may be that of digging a number of short extensions where it is necessary to move the trencher quickly from location to location. Perhaps the pipe must be laid in city and suburban streets where space is scarce.

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The Cleveland Baby Digger, astonishingly fast, extremely compact (only 58 in. wide overall), very mobile (loads or unloads on its own specially-built trailer in less than 5 minutes) having no excess tonnage (weighing approximately 4 tons) and more than amply powered, meets exactly every requirement. It will pay you to investigate.

Send today for revised edition of Catalog No. 10.

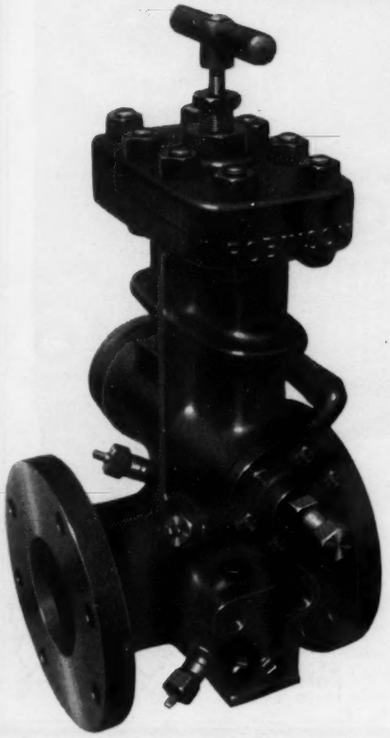
The Cleveland Trencher Company

"Pioneers of the Small Trencher"

20100 St. Clair Ave. Cleveland, Ohio

The CLEVELAND BABY DIGGER

YOU CAN HELP MAKE THIS A PROSPEROUS YEAR WITH THESE MONEY-SAVING FITTINGS



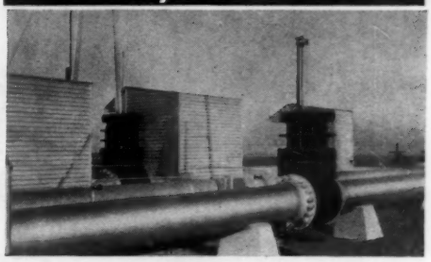
New and improved 125-pound cast iron Robinson Orifice Fitting.

It's not too late to make a New Year's resolution! So decide today to equip your pipe lines with Robinson Orifice Fittings. They'll save money for you—not only in 1931—but for many years to come.

Your metering will be more accurate; you can change plates easier and there'll be no gas loss.

No doubt you'll want to know more about the advantages of Robinson Orifice Fittings. So ask for your copy of latest Catalog.

NEARLY 13,500 IN SERVICE



One 16-inch and one 20-inch 500-pound cast steel Robinson Orifice Fittings in use on a large gas pipe line in central California.

Robinson Orifice Fitting Company
1435 Santa Fe Ave., Los Angeles, California, U.S.A.

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ROBINSON ORIFICE FITTINGS

C-F is "EVERY PURPOSE" Regulation

THIS installation of a Chaplin-Fulton Low Pressure Regulator represents modern practice in safety regulation of natural gas—everywhere.

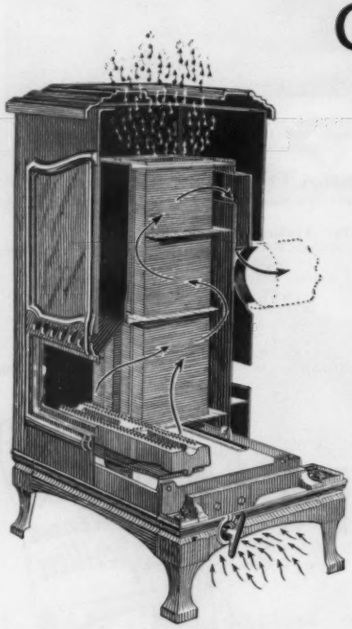
C-F Regulators of more than forty types are widely used where safety is considered quite important, and dependable operation is demanded.

Extra sensitive in response to the variations in flow, they are strong, well designed and have all the characteristics that superior workmanship has been able to create during the experience of the oldest gas regulator manufacturing organization.

Every type of C-F gas regulator is fully illustrated and described in our Catalogue and Bulletins. Present your service problem and we'll send you the correct Regulation solution.

The Chaplin-Fulton Mfg. Co.
28-40 Penn Ave., Pittsburgh, Pa.

THE NEW
WEDGEWOOD
CONSOLE GAS
CIRCULATOR



Visible flame!
Lights automatically with gas pilot!
No radiants to break or burn out!
Can be vented in fireplace!
Beautiful two-tone walnut porcelain console cabinet!
Large amount of radiating surface of heating element!
Welded gas tight and vented!
Down draft diverter allows heater to operate normally under any draft conditions.
Made in two sizes.
For use with Natural Gas and Manufactured Gas.

James Graham Manufacturing Co.
Largest Stove Manufacturers in the West
The all-inclusive Gas Line
San Francisco Newark, Calif. Los Angeles

Tell Your Friends
to Tune In
Friday Mornings
on the
Wedgewood
Cooking School
KGO—KPO—KFI—
KFSD—KGW
KOMO—KHQ
10:50 o'clock

DIRECTORY of the INDUSTRY

SMITH-EMERY CO.
Chemists—Engineers
Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
Offices & Laboratories
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651 Howard St. San Francisco

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124 West Fourth Street, Los Angeles

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Company.....
Position Occupied.....
Street Address.....
City and State.....

Subscription Rates: 1 Year $2.00; 3 years $5.00;
Foreign $3.00 per year

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P. O. BOX 669 LONG BEACH, CALIFORNIA

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CONSULTING NATURAL GAS ENGINEERS
ATHLETIC CLUB BUILDING, DALLAS

SOON We Will Publish MORE VITALLY *Important* NEWS

The Hammer-Bray Company's new 8-acre plant at E. 14th St. and 102nd Ave., Oakland

Last month the pages of this publication announced that ground was already broken for a mammoth new Oakland manufacturing plant of the Hammer-Bray Co.

And in a forthcoming issue of Western Gas we will announce the production of a new line of

SPARK *Lid-top*

GAS STOVES

radically improved and different in design and embodying far more beauty and far greater efficiency than even this unsurpassed line has ever presented.

Hammer-Bray Co.

Manufacturers of Spark Lid-top Gas Stoves—Gas Circulating Heaters, and Other Gas Cooking and Heating Appliances

OAKLAND CALIFORNIA

Los Angeles, 7000 Avalon Blvd.; San Francisco, 180 New Montgomery; Portland, 330 Union Ave., No.; Seattle, 1016 1st Avenue, South.

Sprague Semi-Chrome Leather

Resists Acids and Boiling Water

Now Used in All

Sprague Meters and Regulators

After

Five Years' Tests and Experiments

May we send you samples and data?

The Sprague Meter Co.

BRIDGEPORT, CONN.

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8443 miles of natural gas transmission lines will be constructed during 1931, bringing natural gas to more than 500 towns. All of these lines are to be laid in the 22 states west of the Mississippi River.

WESTERN GAS has more paid subscribers in this territory than the 3 other gas industry publications combined.

More than one hundred manufacturers used 23% more advertising space in WESTERN GAS during 1930 than in 1929.

The paid circulation of WESTERN GAS today is 33% greater than it was a year ago.

WESTERN GAS

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San Francisco: 447 Sutter St.
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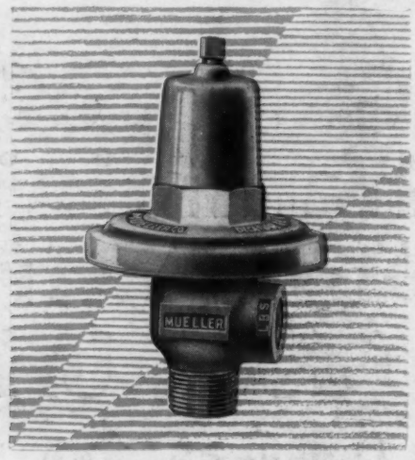

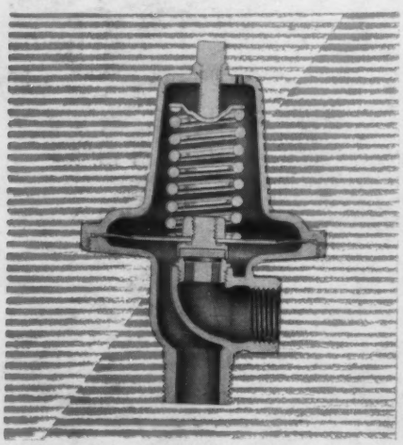

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Branches: **San Francisco: 1072-76 Howard Street; Los Angeles: 2468 Hunter Street; Dallas: 901 McKinney Avenue; Atlanta: 376 Nelson Street, S.W.; New York, Chicago.** ***Canadian Factory:*** **MUELLER, Limited, Sarnia.**

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